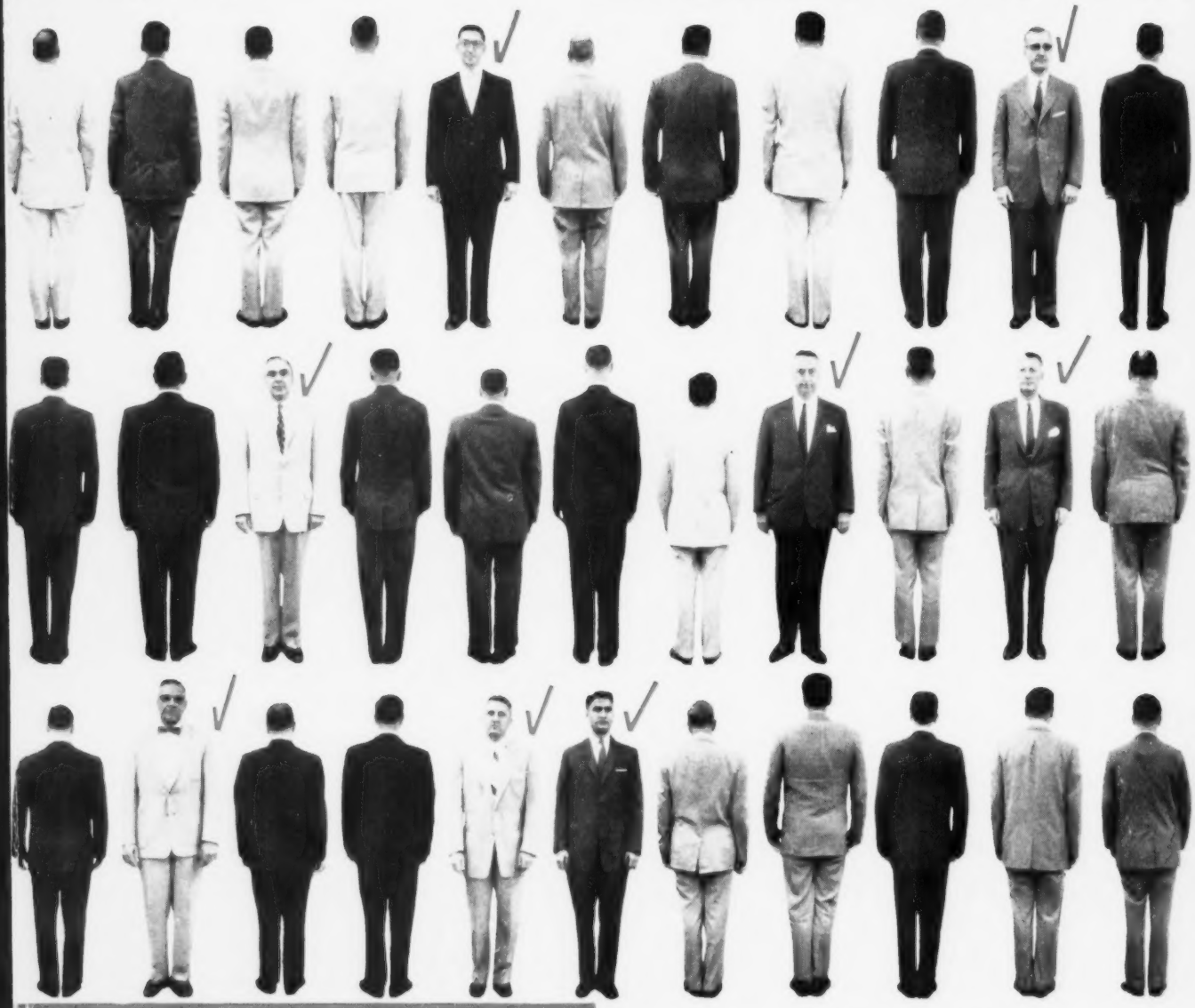
The IRON AGE
June 27, 1957
The National Metalworking Weekly



Special Survey Report:

How To Pick Executives P. 69

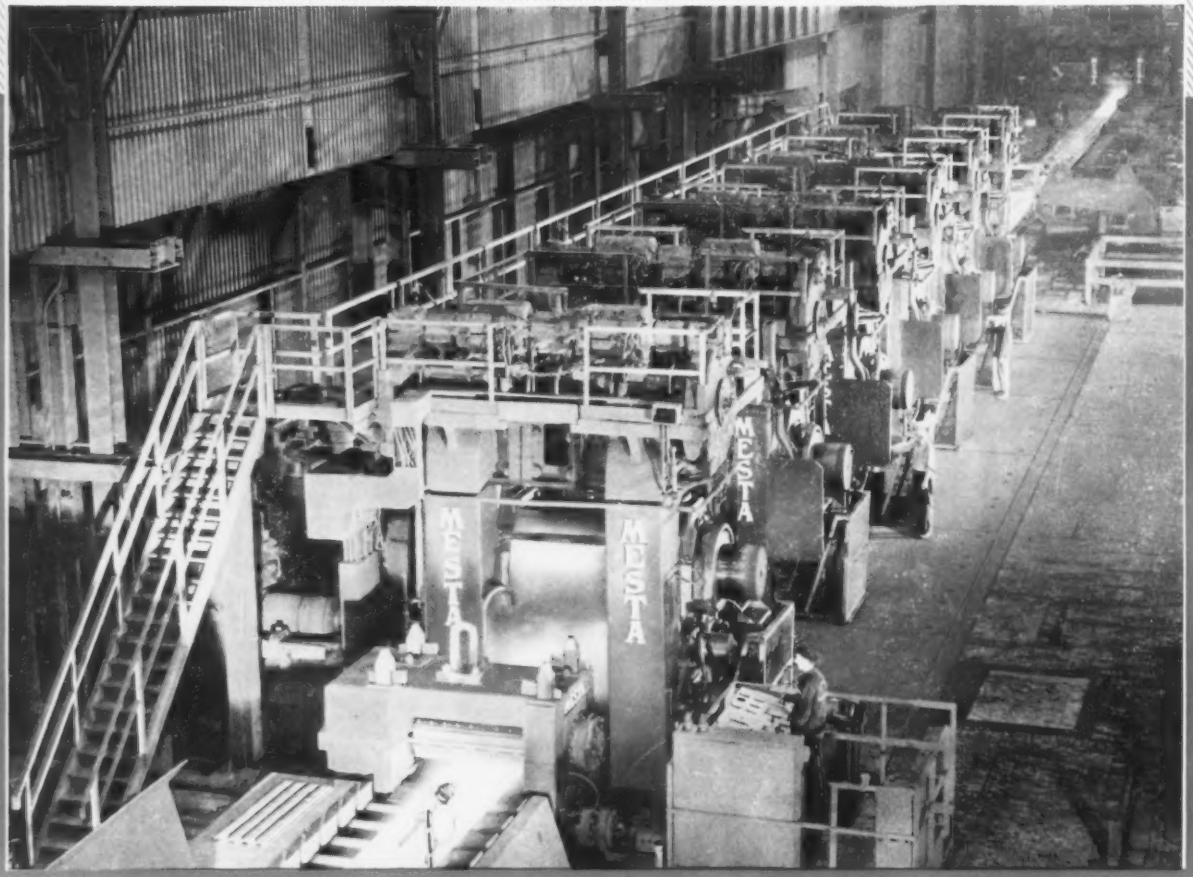
Ways To Lure Industry To Your Community – P. 55

New Steel Process Bypasses Ingot Stage – P. 97

Digest of the Week P. 2-3

HOT STRIP MILLS

Designed and Built by MESTA



MESTA 56" Four-High Hot Strip Mill for Rolling Stainless, Silicon, High-Alloy, and Carbon Steels at Allegheny Ludlum Steel Corporation

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

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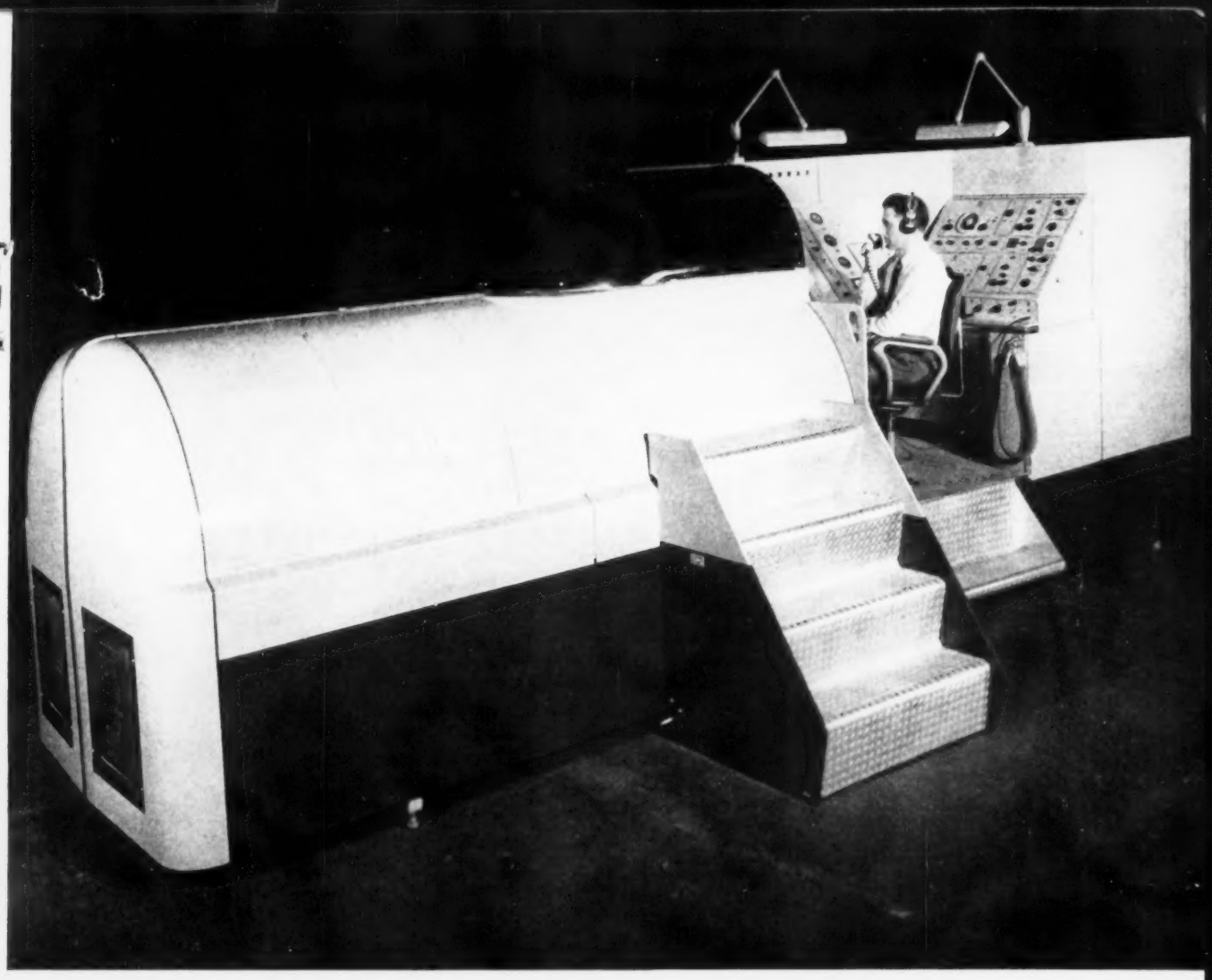
THERE IS NONE BETTER



This steel skin may save a flier's skin

This is the Link C-11B jet flight trainer, used throughout our armed forces for basic and transition training of jet fighter pilots. The instructor at right sets up problems in flight and radio navigation and relays them to the trainee, who is isolated from the outside world by a skin of Bethlehem cold-rolled sheet steel.

Link Aviation, Inc., also uses Bethlehem sheets in their trainers and flight simulators in the construction of mounts and brackets for the various electronic chassis. This application is one of the more interesting and important ones for which sheet steel is so admirably suited. Many of today's substantial uses of sheet steel were relatively inconsequential, tonnage-wise, as recently as a decade ago. Their amazing growth has greatly increased the sheet steel market.

In view of the demand for Bethlehem hot- and cold-rolled sheets, since World War II, our mills at Lackawanna, N. Y., and Sparrows Point, Md., have steadily swelled their output. We would be glad to discuss your sheet requirements and work out a satisfactory schedule with you. A phone call or letter to our nearest office will start things moving.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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THE IRON AGE
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The IRON AGE

JUNE 27, 1957—Vol. 179, No. 26

Digest of the Week in

*Starred items are digested at right.

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NEWS ARTICLES

Scranton Plan Proves Its Industry-Drawing Power

In 12 years, Scranton, Pa., has done a remarkable job attracting

new industry into its area. Chrysler is the latest firm to take advantage of a community plant. **P. 55**

TV Set Tracks Die Layout Machine

A new Alcoa die layout machine, the first of its kind, uses television cameras to check vernier measurements. Horizontal, vertical, and transverse dimensions are read by switching channels. **P. 57**

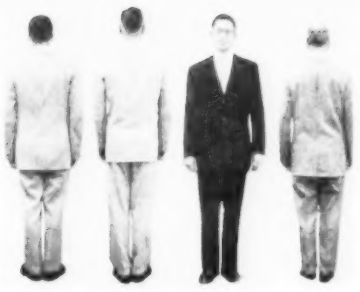
DuPont Ruling Hits B-Y Merger

U. S. Supreme Court ruling that mergers causing a "probable lessening of competition" are illegal bolsters the Justice Dept.'s case against proposed Youngstown-Bethlehem merger. **P. 62**

Industry Plans Smooth Transition to Jets

West Coast aircraft plants are

Metalworking



PICK YOUR MAN: Choosing the right man to fill an executive slot can be a perplexing problem. A special survey report tells how to solve many talent selection dilemmas, based on actual management case histories. **P. 69**

tooling up for jet airliners. But orders for piston and turbo-prop planes continue to come in too. Conventional aircraft will be a big factor in commercial flying for several decades. **P. 85**

It's Time to Act On Bulletin "F"

The Internal Revenue Service is giving machine tool firms an added 60 days to give their views on the proposed revival of Bulletin F. The original deadline was June 30. **P. 83**

FEATURE ARTICLES

New Process Makes Rolled Steel Directly from Pig Iron

Here's a new steelmaking method described for the first time in this country. Developed in Sweden, it's an inexpensive shortcut. You actually bypass the ingot stage and get clean rolled steel from ordinary pig iron. **P. 97**

Blast Cleaning Method Does Job On Large Castings

Steel shot blast cleaning shows its ability to handle giant castings. It does without compressed air. The steel shot cleans in cored areas and other cavities. **P. 101**

Three Dimensional Handling Saves Space, Speeds Orders

A new setup gets two to three times the previous volume of orders from stock. It's done with a fast, efficient warehousing system that uses a combination of special overhead cranes and storage rack assemblies. **P. 102**

New Contour Miller Cuts Fast And Accurate On Hard Materials

A fully automatic machine is contour-milling jet engine blades on high production basis. It cuts with long-lasting carbide milling cutters. Fully loaded, the machine runs for six hours without attention. **P. 104**

Steam Treatment Lengthens Tool Life

Steam circulated by forced convection puts a tough, hard, porous oxide film on tool surfaces. High speed tools are lasting 50 to 100 pct longer. **P. 106**

MARKETS & PRICES

Aluminum Foil Raises Its Sights

Foil makers will sell about 119 million lbs this year, but expect to hit 300 million lb sales by 1960. They're banking heavily on a number of new markets. And they are buying bigger, faster mills. **P. 58**

Are Farmers Finally Starting to Buy?

Tractor sales are starting to equal or better 1956 rate. Some implement dealers are actually short on a few products. Combines get a rush. Suppliers won't get much help until August. **P. 60**

Don't Bet on a Summer Business Slump

Some seasonal slack is bound to occur in industries directly tied-in with seasonal patterns. But overall business will be surprisingly high. Purchasing agents survey shows renewed optimism. **P. 67**

Flared Fin Styling Paces Auto Sales

Radical styling is selling more cars for Chrysler and Ford. Chrysler is booming along at a rate 51 pct ahead of last year. Ford is up 17.5 pct. **P. 78**

Summer Steel Market Looks Better Than Expected

The mills feel better about the summer steel market. Automotive is showing some signs of life. And backlogs seem good enough to keep operations fairly high. **P. 147**

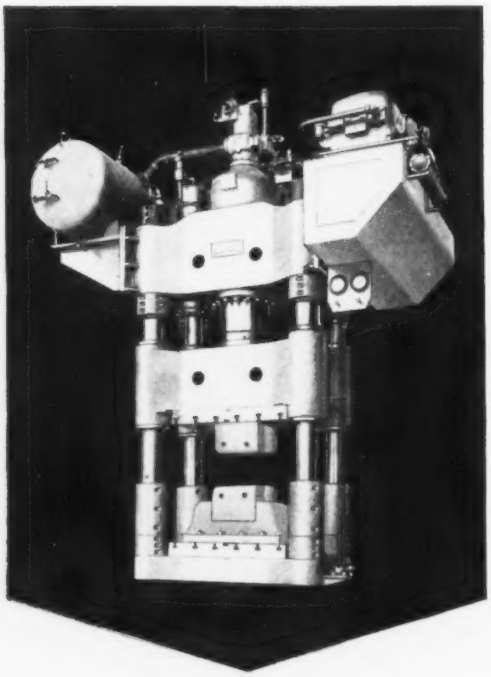
NEXT WEEK

What Makes for Real Success in Business

There's more to success than just getting ahead. Next week Benjamin F. Fairless, president of AISI, tells of the qualities he's observed in oustanding men both in their business life and beyond it.

PRESS or HAMMER?

..which is best for your forged product?

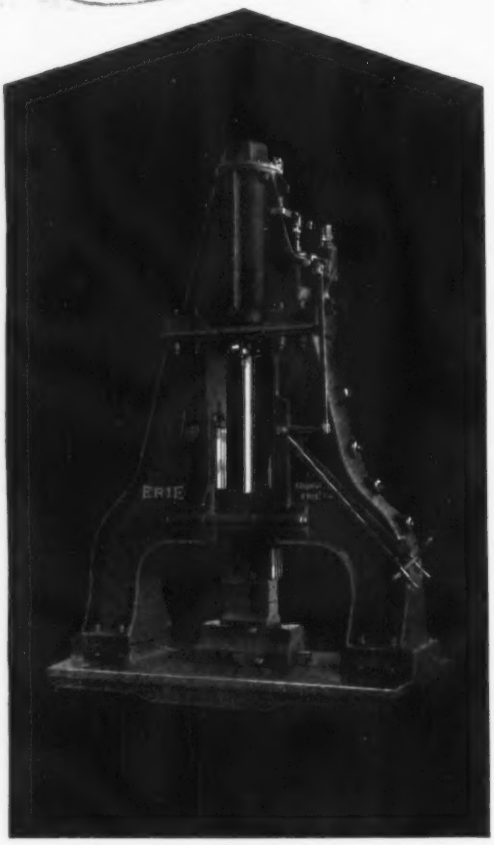


When it comes to open die forgings, there are as many different opinions on what equipment is best as there are open die forge shops and open die forgings.

But, before adding any new equipment, the wise forge shop operator talks with Erie Foundry Company . . . the firm that makes the best in *both* hammers and presses!

Erie's all-steel open die hammers, single frame and double frame, have justly earned their reputation as the industry's most rugged hammers. And now the newer, fast-acting Erie flat die forging presses are proving to be the ideal equipment for meeting the most exacting requirements for any hydraulic press.

So . . . which is best for you—hammer or press? For expert and *specific* advice, talk to the recognized leader . . . Erie Foundry Company. Just call or write.



ERIE FOUNDRY CO. ERIE 1, PA.

ERIE

World's Greatest Name in Forging Machines Since 1895

ÆSOP'S FABLES No. 7

Once there was a fisherman who enjoyed playing the bagpipes as much as he enjoyed fishing. Upon a balmy Summer day, he seated himself on the river bank and played a series of gay tunes . . . hoping this would attract the fish into jumping right onto the shore. But, nothing happened . . . so, he cast a net into the water and soon drew it out filled with fish. Watching the fish dancing and flapping about in the net, the fisherman shook his head and remarked:

"I will have none of your dancing now . . . since you wouldn't dance when I piped!"

Moral:

'Tis a great art to do the right thing at the right time.

. . . and this same "great art" is just what is embodied in famous ADAMANT, *the original high temperature cement* . . . for instance, the bonding strength of ADAMANT *increases* as temperature rises . . . is as strong as the brick it bonds . . . manufactured to perform just right at just the right time!

Designed to withstand extreme temperature differentials, pliable, ready-to-use ADAMANT has proved its versatility for a variety of other uses in maintenance and repair . . . comes ready-mixed in air-tight drums of 100, 250, and 500 lbs. There is more detail in our new Bonding Mortars Bulletin No. 3.

Yellow Pages of 'phone directory have your nearest ADAMANT Distributor.

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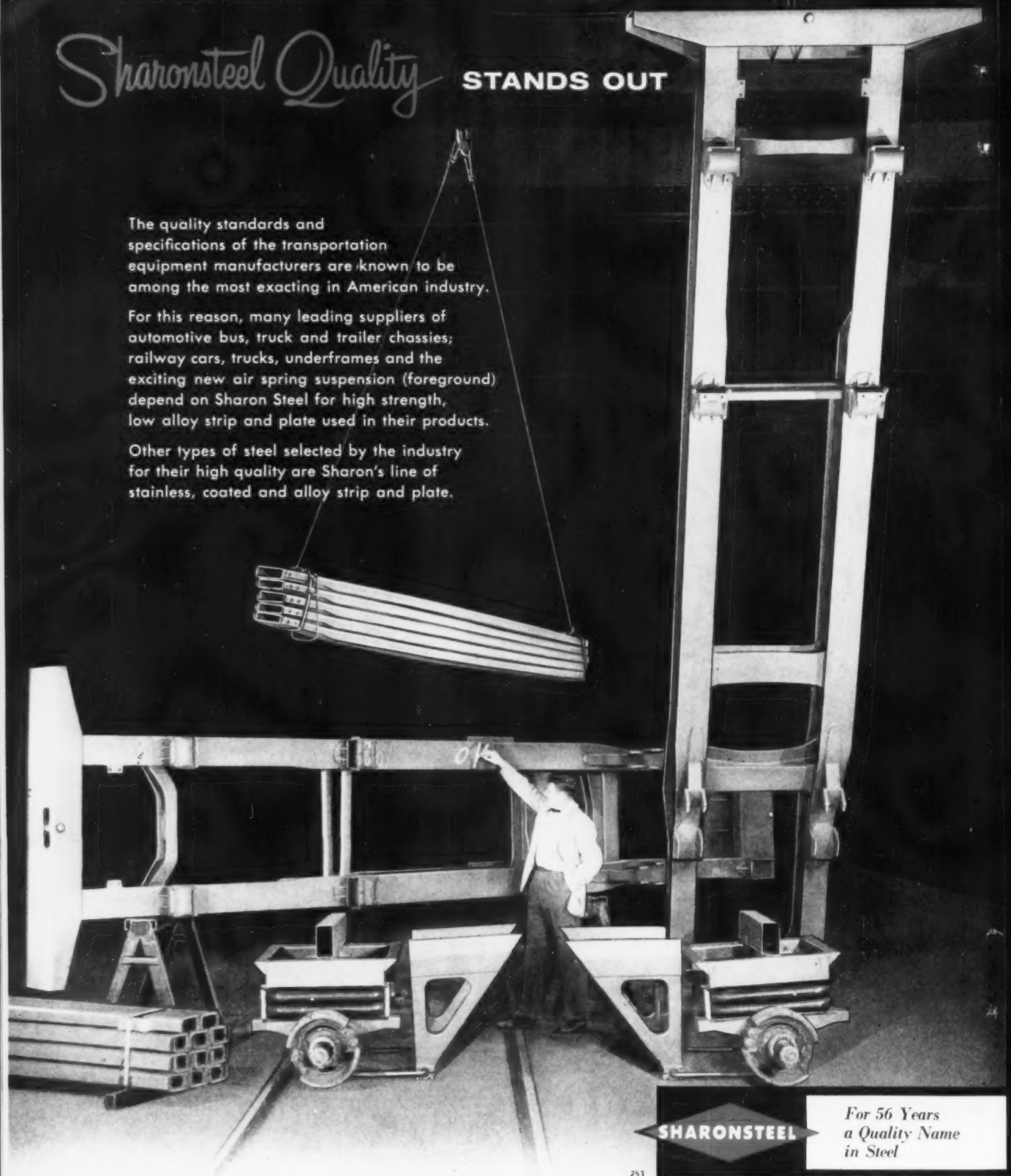
Sharonsteel Quality STANDS OUT

The quality standards and specifications of the transportation equipment manufacturers are known to be among the most exacting in American industry.

For this reason, many leading suppliers of automotive bus, truck and trailer chassies; railway cars, trucks, underframes and the exciting new air spring suspension (foreground) depend on Sharon Steel for high strength, low alloy strip and plate used in their products.

Other types of steel selected by the industry for their high quality are Sharon's line of stainless, coated and alloy strip and plate.



SHARONSTEEL

For 56 Years a Quality Name in Steel

253

SHARON STEEL CORPORATION, SHARON, PENNA.

CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, MONTREAL, TORONTO

The Last Six Months: They Begin To Look Good

This is crystal ball gazing time for the last half of the year. The official votes are in. The experts are looking cautiously for an "improvement" by the fourth quarter.

But there is some disagreement. A few hardy souls believe we may have a recession this year. Others feel we will not show much statistical gain until early next year.

Those consistent pessimists who called for a recession earlier in the year have been conspicuous by their silence recently. Business just failed to fall apart.

Reports from our grass roots informers show much optimism. The man on the street is not worried. He is spending. At the same time he is not going too far overboard in debt. He is a better judge of his capacity than is the Federal Reserve Board—or any other agency.

The average manufacturer is doing quite well. He is getting edgy about the size of his inventories. After the vacation period he will be buying metals and machines at a faster pace.

Automakers have their fingers crossed on labor for next year. There may well be a strike. That means a complete overhauling of purchasing patterns for materials that go into 1958 models. Dealers must be well stocked long before the strike deadline next June 1.

There is a big change in the economy in the past few years: Manufacturing pay and working hours are a smaller part of the whole picture.

While the steel, aluminum, and copper industries have been going slowly down hill in production, the effect on the economy as a whole is not marked. But the trend in these basic industries will be upward in August. Steel production in the third quarter may slip to an average of 79 to 80 pct. The level was 88.5 pct in the second quarter and 96 pct in the first.

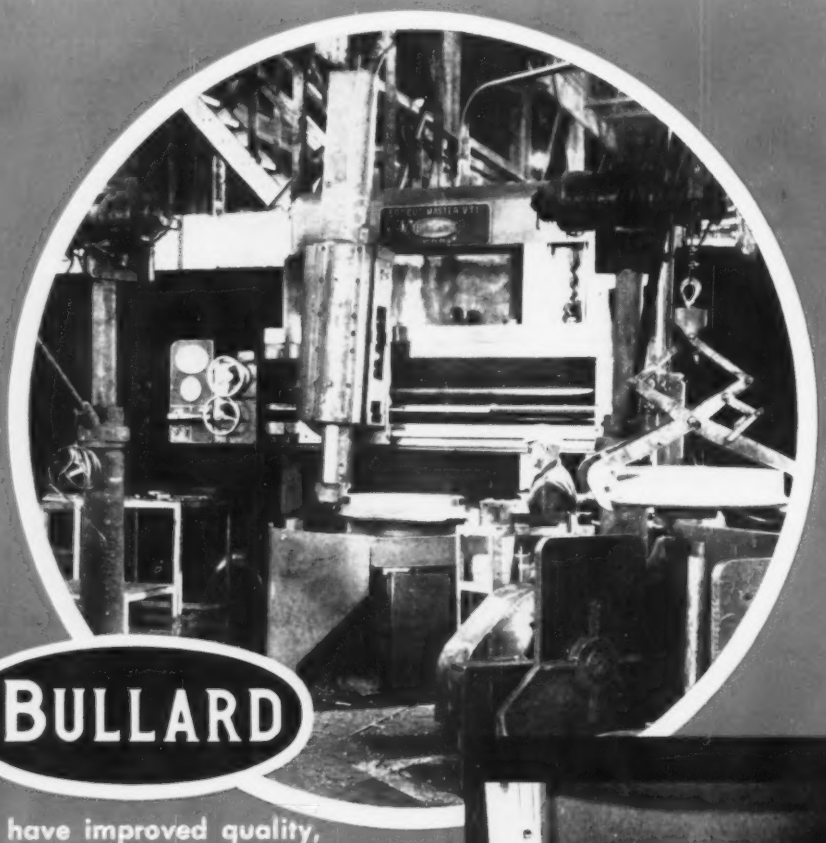
In the fourth quarter steel activity will show a significant upturn. The year will finish out close to 117 million tons of ingots.

Wise old heads in the purchasing game already are quietly getting ready to slip in their orders for materials before a stampede starts this fall. They sense a piling up of orders. They see a lot of delayed deliveries because of shutdowns and vacations. They know that the price trend is still upward.

The word from the grass roots: The trend is upward now. Better get prepared for some new highs and an end to the sideways movement.

Tom Campbell

Editor-in-Chief



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We have improved quality, quantity and appearance of our product with . . .

BULLARD MAN-AU-TROL
MODEL 75

This has been accomplished by one of the nation's largest manufacturers of railroad car wheels.

The plant superintendent tells us "that improved quality is obtained through greater machining accuracy – that quantity is improved with Man-Au-Trol, Model 75 since each operator can machine 76 pieces per eight hour shift compared to 40 pieces by our former method – that appearance is improved because of superior finish obtained by using single point cutting tools instead of ground formed tools."

How about you? Are you employing all the advantages offered by Bullard Man-Au-Trol, Model 75, to your machining problems.

To cut costs when cutting metal . . . buy BULLARD

Call your Bullard Sales Engineer, he's as near as your telephone or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

Crises

Sir—It has been some time since I've had the pleasure of writing you. But I do want to let you know how much I enjoyed your May 16 editorial, "Never-Ending Crises, They Will Be With Us Always."

So much so, that I would like to have it published in a number of our French papers.

I don't think I have read, for some time, such a clear-minded editorial. No use to say that I am fully in accord with you.—Pierre Dufour, Dufour Pere, Fils & Cie, Levallois-Perret (Seine), Paris.

▪ Permission granted.—Ed.

Depreciation

Sir—We are very much impressed with the article "Let's Make Sense in Our Depreciation Policies" by Joel Barlow, in your June 6 issue.

This, obviously, is a very timely subject and we wish to congratulate you on giving the article such an important position in your magazine.—P. R. Johnson, Ass't to the Pres., Wyman-Gordon Co., Worcester, Mass.

Titanium Prices

Sir—If available please supply at your early convenience four copies of your June 13 article, "Will Lower Prices Help Titanium." I'd also like to point out that Cramet's price reduction of June 3, amounted to 50¢ per lb, and not 25¢ as you stated.—J. A. Bryson, Cramet Inc., Chattanooga, Tenn.

▪ Readers, Bryson is correct, the price cut was 50¢ per lb.—Ed.

Glow Discharge

Sir—We are very interested in your featured article in the May 2 issue entitled "New Nitriding Process Uses Glow Discharge". Would you be kind enough to send our company 12 copies of this article.—L. A. Best, Engr., Industrial Furnace Div., The A. F. Holden Co., Los Angeles, Calif.

Welding

Sir—I note with great interest the subject "Weld Pipelines Faster by Automatic Process" on p. 94 of your May 2 issue, and I wonder if additional copies of this article are available.—R. L. Looney, District Mgr., The Lincoln Electric Co., Cleveland, Ohio.

▪ A few copies are still available.—Ed.

Aluminum

Sir—May we please have a copy of the article, "How to get More for Your Aluminum Dollar" which appeared in the Jan. 31 issue. We find great use for these articles in our Library as they are referred to by our Training Group.—D. C. Hosmann, The American Brass Co., Waterbury, Conn.

▪ Copies are on the way.—Ed.

Quality

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There is no substitute for quality whether you are interested in the components, the workmanship or the end product you manufacture.

One of the basic components of almost every industry is fasteners. Successful operations that cash in on every opportunity for faster assembly utilizing maximum worker output with minimum loss of materials—find that quality fasteners such as Southern Screws form a dependable foundation for profitable production.

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...and a Foster truckload will be on the way immediately. Or a carload... or any quantity."

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News From Abroad

When IRON AGE editor-in-chief Tom Campbell was in Falun, Sweden, last year getting the exclusive story on Stora Kopparberg's Kal-Do rotary oxygen steelmaking process (see IRON AGE, Oct. 19, 1956) he was laying the groundwork to get another "first" for IRON AGE. The story on Stora's process for rolling steel directly from pig iron powder is in this issue p. 97.

In the photo you can see that the process has impressed the IRON AGE editor-in-chief and it is interesting to the others even though they know all about it.

Good Timing—This story is all the more timely in view of the powder work being done in this country and in view of the interest in direct reduction of ores, direct rolling of steel and the increased use of concentrated ores.

In the photo shown below, which was taken in Stora's working laboratory (practical projects with cooperation between the lab and the operating department are carried on here), are, left to right: Professor Bo Kalling, Stora's chief of research; Mrs. Johansson; Mrs. Campbell; Tom Campbell; Folke Johansson, Prof. Kalling's assistant.

Fact Finders

The National Industrial Conference Board is one of the best nonprofit, fact-finding laboratories in the world. So when our editors learned it was just about wrapping up a two-year study of executive selection, they couldn't help but think it a "natural" for the Survey Report to Management Series.

Old Hand—We hope you'll agree. The special article "How To Pick Executives" on p. 69 this week brings you some highlights of this exhaustive study. It's a must for those who are looking for better ways to choose executives — and those who want to throw their hat into the management ring.

New Puzzler

An unlikely bathroom has only one door which has a spring lock that cannot be opened from the inside when sprung. There is a barred skylight that cannot be reached and the room has no window. A man (not over bright) turns on the water to take a bath, finds that something has gone wrong with the faucets and he cannot turn the water off. If he yells no one can hear him because of sound proof walls.

How can he keep from drowning?

CHILE	COLOMBIA	PERU	ARGENTINA
SPAIN	PORTUGAL	SO. AFRICA	SWEDEN
ISRAEL	JAPAN	BELGIUM	MEXICO
INDIA	AUSTRIA	BRAZIL	CANADA
ITALY	GERMANY	URUGUAY	ENGLAND
DENMARK	FINLAND	FRANCE	U. S. A.

24 NATIONS UNITED...
on Choice of Yoder Mills for Pipe and Tube Manufacture

It all started less than two decades ago with the introduction by Yoder—and the rapid adoption by American industry—of a revolutionary new type of mills for cold forming and electric-resistance welding of pipe and tubing. England, France, Italy, Mexico, Argentina, and Brazil soon followed the U.S.A. in adopting these mills. Other countries boasting any kind of modern metal working industry did likewise, even including distant Japan, India and South Africa. Production, depending on requirements, varies from 25,000 up to 75,000 feet per 8-hour shift.

•

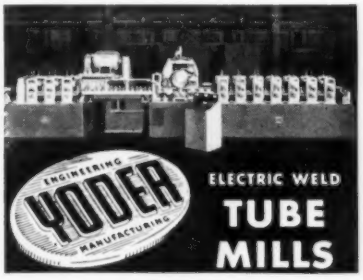
By this time, England, Italy and Argentina each have a total of ten Yoder mills in operation; Brazil, eight; Mexico, six; France, five; other nations somewhat in proportion to their population. In many nations, Yoder mills now supply from 50% to 90% of all welded tubes used. Several outstanding production records have been scored by operators in foreign countries, most recently in Italy. Reasons: the simplicity of design, ease of operation and dependability of Yoder mills. Secondly, generous assistance rendered by Yoder in training operators everywhere.

•

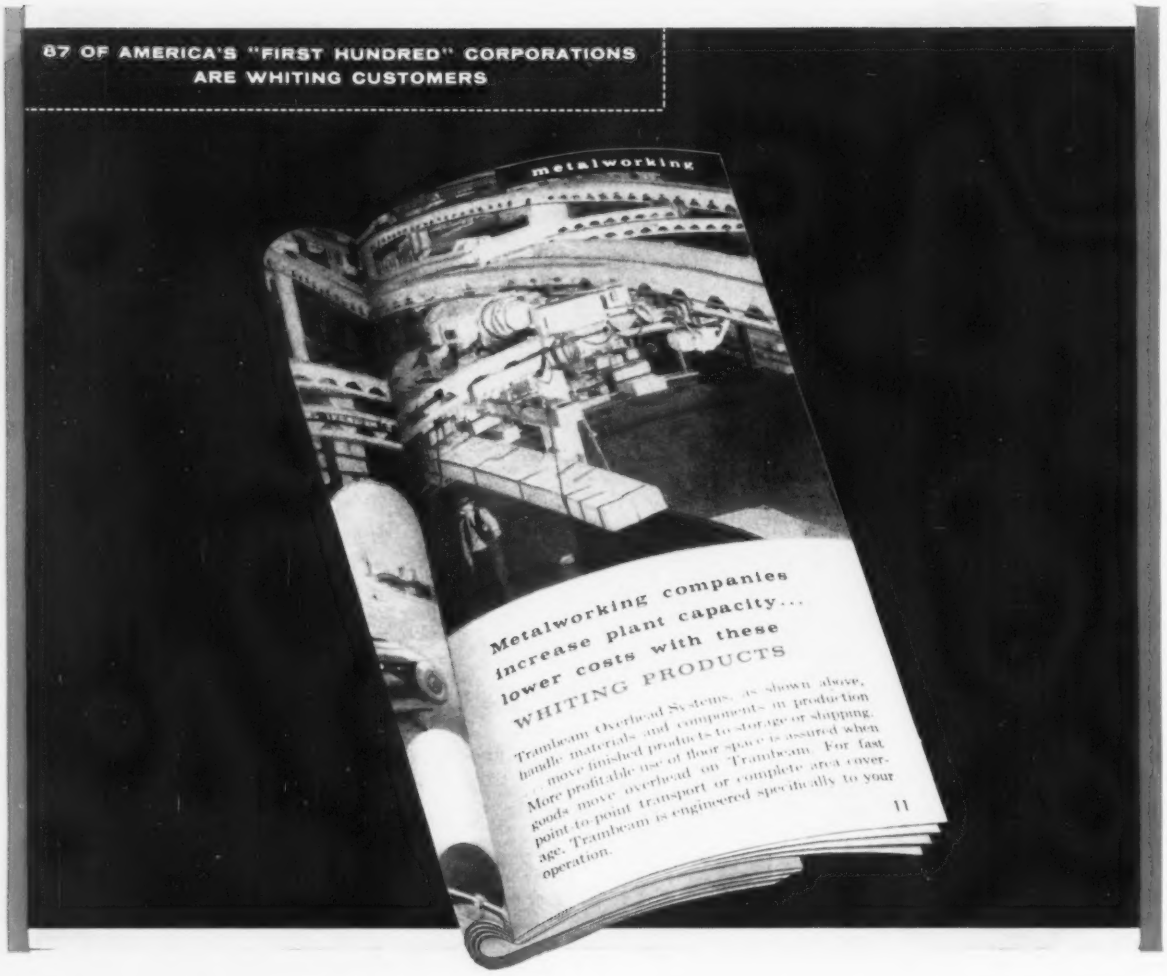
Through technological advances, Yoder leadership in tube mill design has been jealously maintained and strengthened from year to year. Ask for literature giving details of the latest improvements. Correspondence invited.

THE YODER COMPANY

5510 Walworth Ave. • Cleveland 2, Ohio, U.S.A.



87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS


metalworking
Metalworking companies increase plant capacity... lower costs with these
WHITING PRODUCTS
Trambeam Overhead Systems, as shown above, handle materials and components in production ... move finished products to storage or shipping. More profitable use of floor space is assured when goods move overhead on Trambeam. For fast point-to-point transport or complete area coverage, Trambeam is engineered specifically to your operation.
11

Here's how to "clear the decks" for efficiency and profits

See how Whiting Trambeam Systems handle materials and components overhead to keep floors and aisles clear for more efficient production . . . move finished products to storage or shipping. This new, 32-page, pocket-size booklet shows the advantages of Trambeam's point-to-point transport or complete area coverage. Tells how Trambeam can be custom-engineered to your exact requirements.

There's other helpful information here, too . . . on Whiting Cranes . . . on Trackmobile, the "Road-to-Rail Convertible" that speeds handling of freight cars . . . on every Whiting product used in your type of industry. Write today for a copy of "Working for Profit". *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*

WHITING TRAMBEAM

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

JULY

Truck-Trailer Manufacturers Assn.—Summer meeting, July 16-17, Homestead, Hot Springs, Va. Society headquarters, 710 Albee Bldg., Washington 5, D. C.

National Tool & Die Manufacturers Assn.—Summer meeting, July 24-27, Grove Park Inn, Asheville, N. C. Society headquarters, 907 Public Square Bldg., Cleveland.

AUGUST

Society of Automotive Engineers—West Coast meeting, Aug. 12-15, Olympic Hotel, Seattle. Society headquarters, 485 Lexington Ave., New York.

American Institute of Electrical Engineers—Pacific general meeting, Aug. 28-30, Chinook Hotel, Yakima, Wash. Society headquarters, 33 W. 39th St., New York.

SEPTEMBER

American Mining Congress—Metal mining and industrial minerals convention, Sept. 9-11, Hotels Utah & Newhouse, Salt Lake City, Utah. Society headquarters, 1200 18th St., Washington, D. C.

Instrument Society of America—12th annual instrument-automation conference and exhibit, Sept. 9-13, Cleveland Auditorium, Cleveland. Society headquarters, 313 Sixth Ave., Pittsburgh.

National Petroleum Assn.—Annual meeting, Sept. 11-13, Traymore Hotel, Atlantic City, Society headquarters, 958 Munsey Bldg., Washington.

Marking Device Assn.—National meeting, Sept. 19-20, Roosevelt Hotel, New Orleans. Society headquarters, 912 Chicago Ave., Evanston, Ill.

Steel Founders' Society of America—Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

The American Society of Mechanical Engineers—Fall meeting, Sept. 23-25, Statler Hotel, Hartford, Conn. Society headquarters, 1010 Empire Bldg., Pittsburgh.

Standards Engineers Society—Sixth annual meeting on standardization—economy through application Sept. 23-25, Hotel Commodore, New York. Society headquarters, P. O. Box 281, Camden, N. J.

Assn. of Iron & Steel Engineers—Annual convention, Sept. 23-26, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1010 Empire Bldg., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 26-27, Netherland-Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

OCTOBER

The Electrochemical Society—Semi-annual meeting, Oct. 6-10, Statler Hotel, Buffalo. Society headquarters, 216 W. 102nd St., New York

American Institute of Steel Construction—35th annual meeting, Oct. 6-11, Hotel del Coronado, Calif. Society headquarters 101 Park Ave., New York.

American Society of Lubrication Engineers—Fourth conference, Oct. 7-9, Royal York Hotel, Toronto, Ont., Canada. Society headquarters, 84 E. Randolph St., Chicago.

Committee on Vacuum Techniques—Fourth annual symposium on high vacuum technology, Oct. 9-11, Hotel Somerset, Boston. Society headquarters, Box 1282, Boston.

PROGRESS IN STEELMAKING . . .

ALL-BASIC OPEN HEARTH FURNACE

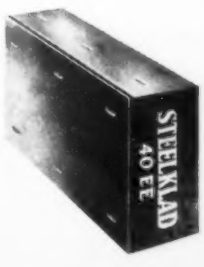
Provides greater refractoriness for increased production at low cost.

This development in open hearth furnaces, which has scored impressive results both in Europe and America, marks an important step forward in the history of steelmaking. In the All-Basic Open Hearth Furnace, the roof, front and back walls, port ends, downstakes, and at least part of the checker system are all constructed of basic brick.

Properly handled, the All-Basic Furnace operates more economically than those made of silica, with equal or lower fuel costs, and with decreased overhead charges, resulting in a decrease in cost of ton per ingot.

For complete information on this important new development, write for free technical report: "The All-Basic Open Hearth Furnace."

General Refractories Company
Philadelphia 2, Pa.



GENERAL REFRACTORIES

Extend Metal Life Under Fire

600%

WITH HIGH VACUUM

Today, vacuum melted metals are being used by leading manufacturers of aircraft engines, turbine blades, electronic tubes, ball bearings, nuclear reactors, or wherever superior performance under high temperatures is required. For instance, use of vacuum melted alloys increased ball bearing life under high temperatures by 600%.

Limitation on product performance caused by failure of critically stressed parts can be a thing of the past. Vacuum melting produces cleaner, more homogeneous metals, which have greater fatigue life, strength, ductility, and machinability. In addition to a better product, this can often mean fewer rejects and lower costs.

If you are responsible for quality control or product performance, it will pay you to contact NRC for information on what vacuum metallurgy can do for you. Benefit from our 17 years' experience gained through building and operating more vacuum furnaces than any other organization in the world. We can help you with your program of product improvement. Write today to NRC Equipment Corp., Dept. 16F, Charlemont Street, Newton 61, Massachusetts.

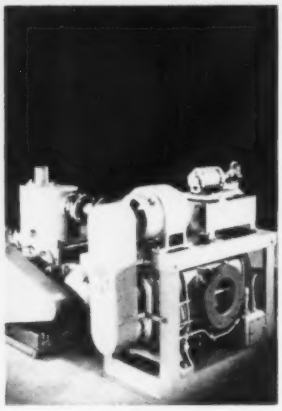
Reliable equipment for all your high vacuum needs

Cut pumping costs with less maintenance and greater dependability. Stainless body and non-corrosive parts facilitate cleaning and prevent corrosion. Complete size range from 1" to 16"

Write for bulletin No. DP-3.

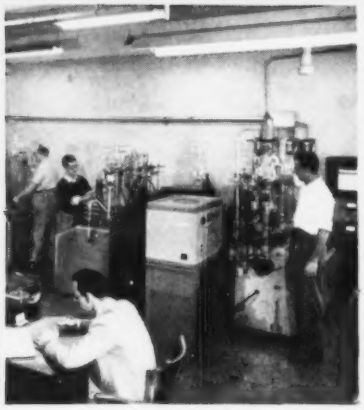
Rugged new vacuum gauge with high accuracy over unusually wide range of 0.0001 — 1000 mm Hg. Thermocouple, Pirani, and hot wire ionization gauges available.

Write for bulletin No. G-3.



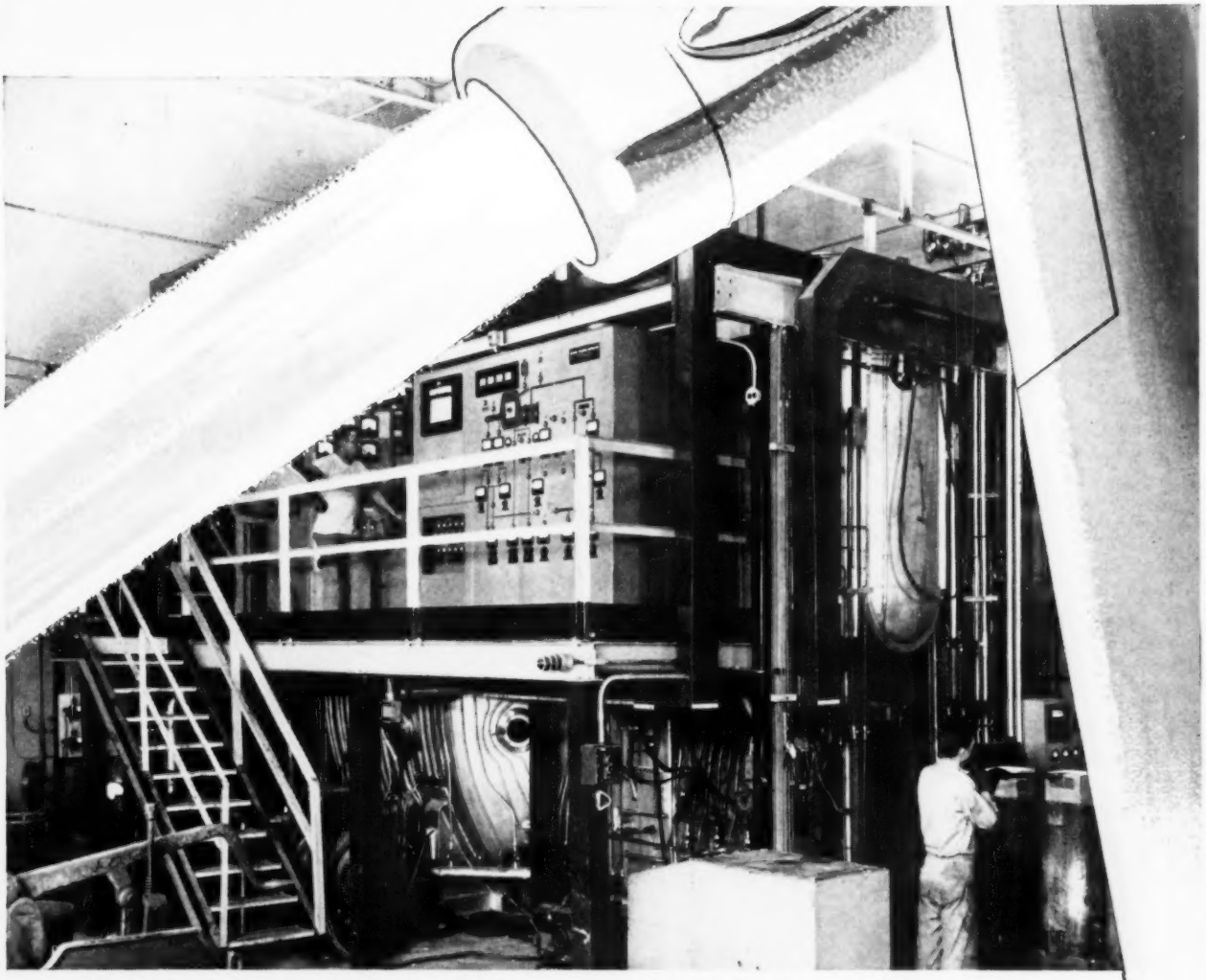
High speed vacuum pumping throughout entire micron range with NRC mechanical booster pumps. Especially suited for vacuum metallurgy. Capacities available from 1000 to 12,000 CFM.

Write for bulletin No. MB-1.



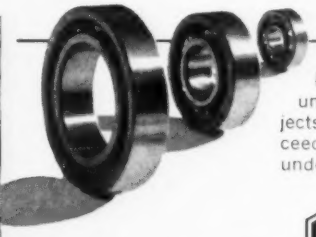
Gas content of metals determined quickly and accurately with NRC gas analyzers. Measure content of hydrogen, oxygen and nitrogen as low as 1 part per million.

Write for bulletin No. VA-2.



Gas-free, super clean, superior ingots up to 3000 lbs. are produced in this NRC Vacuum Induction Furnace. The world's largest, this unit is installed at Vacuum Metals Corporation Division, Crucible Steel Company.

Get started easily with a research, developmental or production unit. You can choose from a standard arc, resistance or induction heating furnace with capacities from 2 lbs. to 5,000 lbs.



Increased bearing life by 600% under high temperatures. Race rejects cut 90%. Handbook ratings exceeded up to 200% for bearing life under normal temperature.

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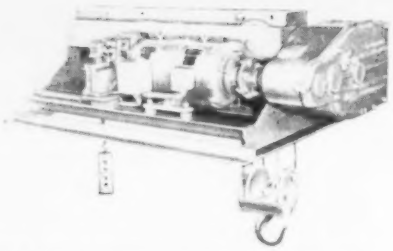
EQUIPMENT CORPORATION

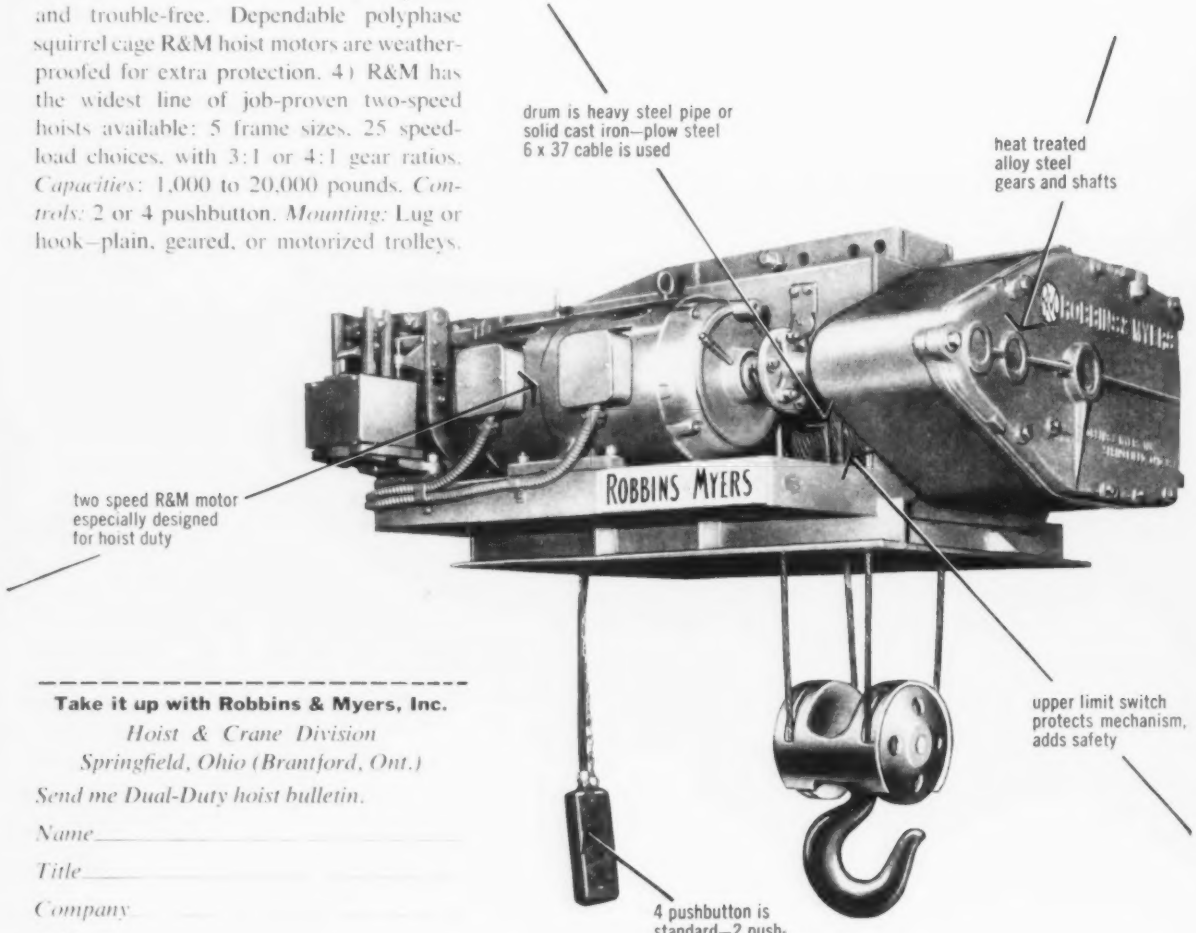
DEPT. 16F, CHARLEMONT ST., NEWTON 61, MASS.

A Subsidiary of National Research Corporation



Dual-Duty two speed hoists give you *precise* load spotting, plus fast lifting when you want it. Four outstanding advantages make R&M Dual-Duty hoists your best buy when you can't afford performance compromises: 1) You always have two stabilized speeds to raise or lower any load within the capacity of the hoist. 2) Dual Duty hoists are thus easy to operate—they perform exactly the way the operator wants them to. 3) First cost and maintenance are low because electric controls are simplified and trouble-free. Dependable polyphase squirrel cage R&M hoist motors are weatherproofed for extra protection. 4) R&M has the widest line of job-proven two-speed hoists available: 5 frame sizes, 25 speed-load choices, with 3:1 or 4:1 gear ratios. *Capacities:* 1,000 to 20,000 pounds. *Controls:* 2 or 4 pushbutton. *Mounting:* Lug or hook—plain, geared, or motorized trolleys.

slow spotting, fast lifting hoist


drum is heavy steel pipe or solid cast iron—plow steel 6 x 37 cable is used
heat treated alloy steel gears and shafts
two speed R&M motor especially designed for hoist duty
ROBBINS MYERS
upper limit switch protects mechanism, adds safety
4 pushbutton is standard—2 push-button is optional at no extra cost

Take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me Dual-Duty hoist bulletin.

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ROBBINS & MYERS **hoists • cranes • winches**

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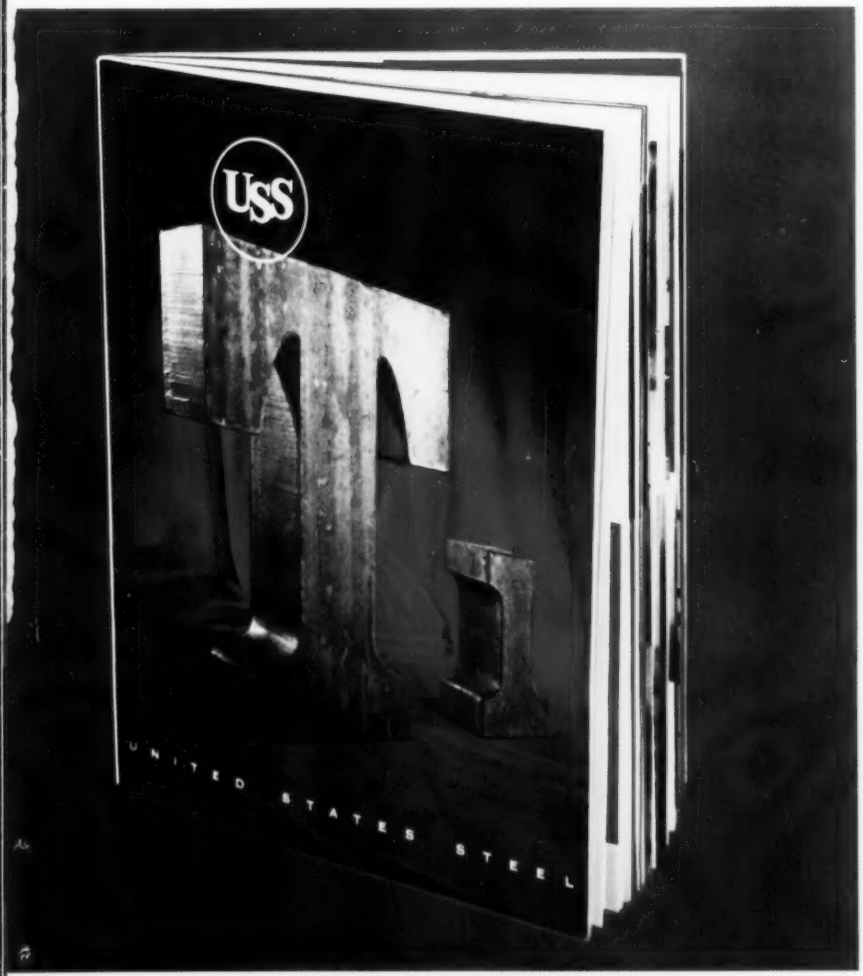
It tells WHERE to use USS "T-1" Steel!
WHEN to use it! HOW to use it!



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UNITED STATES STEEL

USS

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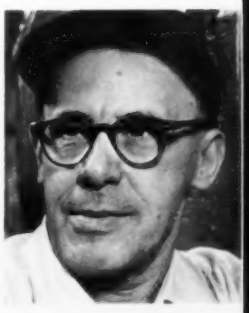
"It's a hydrogen-annealed
with a 30-micro-inch finish,"

mass spectrometer magnet...

says **Albert J. Gross,** *U. S. Steel Machinist, Homestead Forgings Division*



We must admit that there was some doubt that these sections in the picture could ever be made to the specifications required by Argonne National Laboratory. They are yoke members and pole pieces for a 100-inch double-focus, mass spectrometer.

One of the primary requirements of the magnet was that it be made from as pure a steel as was commercially obtainable. Also, it had to be produced in one heat to minimize variation in behavior of the magnet.

The heat-treating problems were enormous and would have stumped any organization without the facilities and background of USSteel. The annealing, which was performed in a hydrogen atmosphere, developed a uniform, large grain structure for optimum magnetic characteristics. Unusual techniques were used, and a special steel jig was constructed so that the large pieces could be annealed without warpage.

Machining problems are best described by Al Gross who has worked as a USS Machinist for 34 years, 20 of them in the Forgings Division. In his words, "The specs for machining tolerances, surface finish and flatness were so exacting that at first there was doubt that it could be done. The wide plates, which are actually in three pieces, have a 50-micro-inch finish. The narrow pole pieces had to be parallel and flat within plus or minus .001". The ends had to be within .002" of a true square, and the surfaces were polished to a 30-micro-inch finish."

We don't receive orders for spectrometer parts very often. But even so, this job shows that a wide range of facilities are available when you specify a USS Quality Forging. From the melt shop, through the forging, heat-treating, machining and inspection departments, you can be sure of equipment of the best type, operated by men of the highest skill.

Please direct your inquiries for forgings to our nearest District Office and your request for our free 32-page booklet on forgings to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS QUALITY FORGINGS

heavy machinery parts . . carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

specialty forgings of all types

USS

UNITED STATES STEEL

NOTHING *can equal* *Stainless Steel*

in its unique combination of properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. If you're looking for a reliable source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
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USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL

◀

FOR BEAUTY. Stainless Steel shingles in diminishing sizes create a beautiful, gleaming steeple for the State Street Methodist Church in Bristol, Virginia. Architect Allen Dryden, of Kingsport, Tenn., specifies Stainless Steel for jobs like this to assure lasting beauty, protection from weather and freedom from maintenance. This spire is sheathed in Type 302 26-gage Stainless Steel, and the cross is built of Type 302 Stainless bars. Construction details were engineered by Overly Manufacturing Company, Greensburg, Pa., who also fabricated and erected the steeple.

FOR FLEXIBILITY OF DESIGN. In this "Cold-Zone" cooling-storage milk products tank, made by Damrow Brothers Company, Fond du Lac, Wisc., Type 304 10-gage Stainless Steel was used for the smooth, easy-to-clean inner wall. Again Stainless Steel—this time Type 304 16-gage—was used for the dimpled outer wall which is stave-welded to the inner shell. This unusual design of dimple size and arrangement gives proper baffling and velocity to the refrigerant as it passes through the cooling area. Stainless Steel provides greater sanitation, durability, long life, strength and—the flexibility necessary to make this design possible.

FOR DURABILITY. The Master Combination Padlock, designed for school locker room use and built by Master Lock Company, Milwaukee, Wisconsin, features a double-case construction—with Type 430 Stainless Steel used for the outer case. This Stainless Steel design makes it one of the strongest padlocks available. In addition to increasing the lock's durability, Stainless Steel also adds to its sales appeal and to its resistance to the corrosive atmospheres of damp locker rooms. The springs, too, are made from USS Stainless Steel—Type 304 Ameroxide coated wire.

LOW COST . . . LIGHT WEIGHT . . . PORTABLE

The Model 40 Iriditron, an isotope radiography machine capable of containing 30 curies of Iridium 192, is the lightest unit manufactured that can make panoramic exposures at a distance. It is especially designed for exposures which cannot be made conveniently with X-Ray equipment.

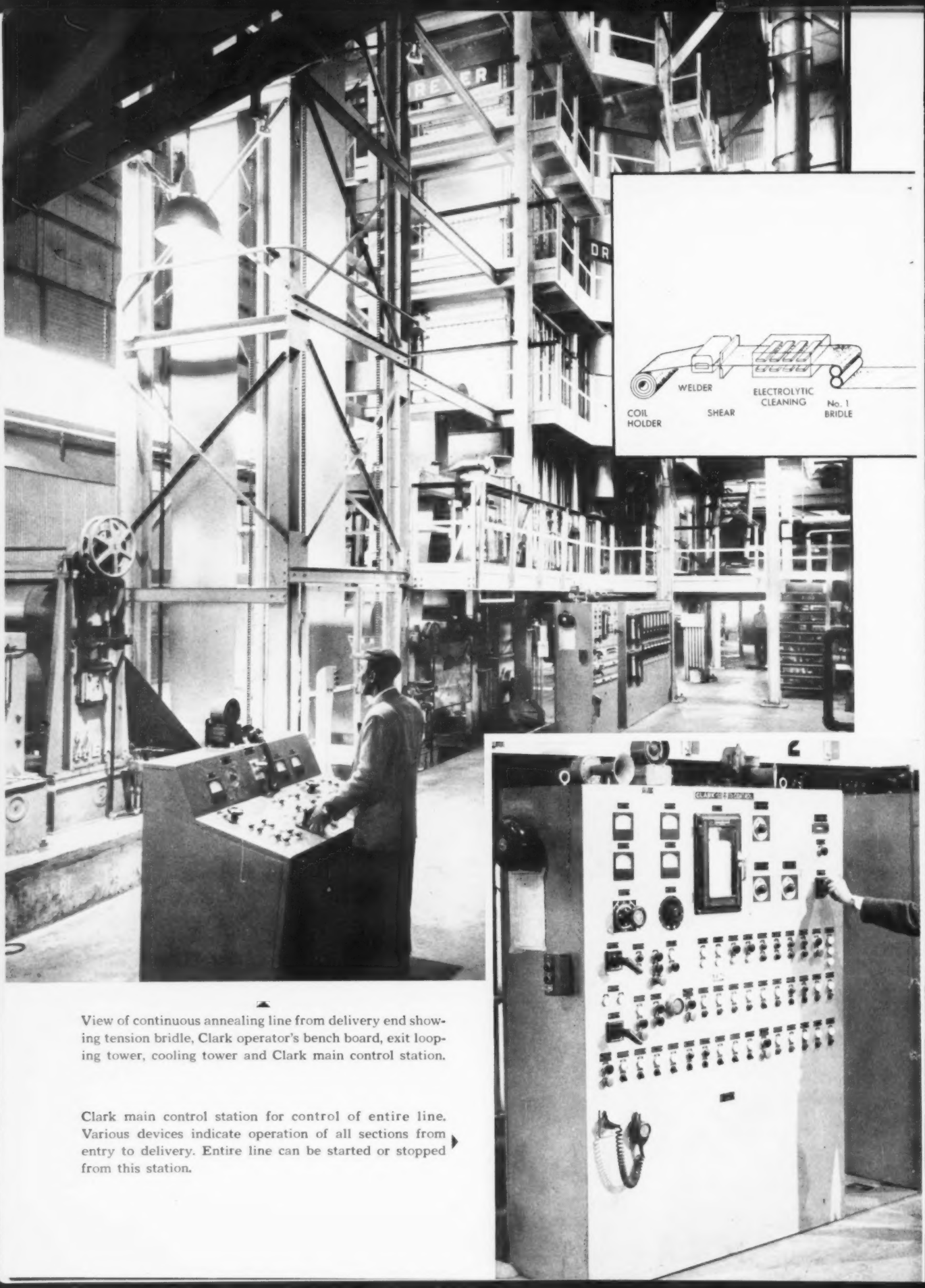
Weighing only 40 pounds, it is readily portable and is compact enough to be transported in the trunk of a car.

The Iriditron also stores the source when not in use and the shielded head serves as a shipping container.

Nuclear Systems has a versatile line of remote handling equipment for the safe exposure of strong gamma sources . . . for every radiography job.

NUCLEAR SYSTEMS
A DIVISION OF THE BUDD COMPANY, Philadelphia 32

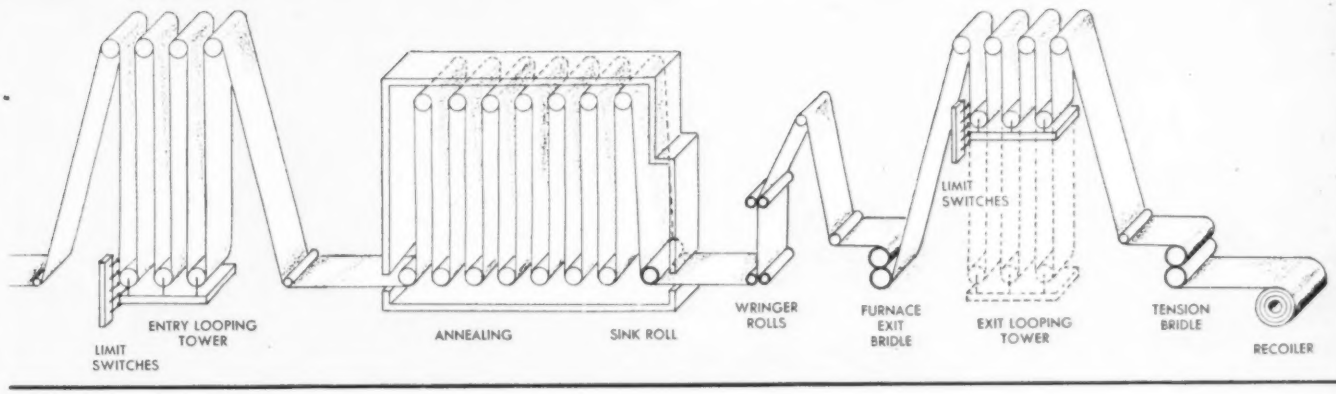
Budd



View of continuous annealing line from delivery end showing tension bridle, Clark operator's bench board, exit looping tower, cooling tower and Clark main control station.

Clark main control station for control of entire line. Various devices indicate operation of all sections from entry to delivery. Entire line can be started or stopped from this station.

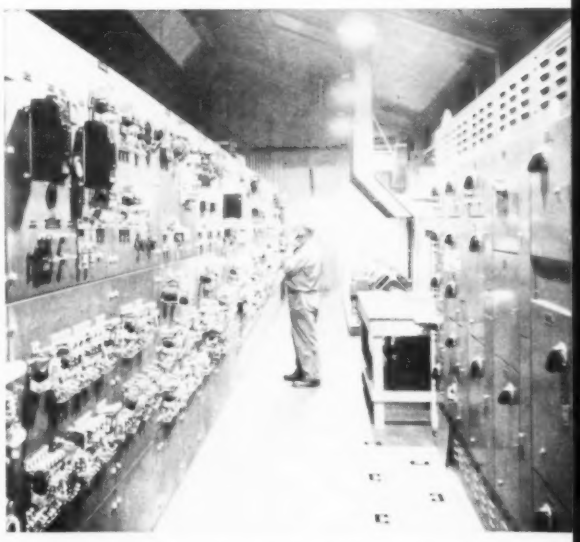
CONTINUOUS ANNEALING LINE at Empire Steel relies on CLARK for precise speed and tension control • • •



Empire Steel Corporation at Mansfield, Ohio is a leading producer of high-grade silicon electrical steel. To help meet the increasing demand for this product, the corporation recently installed a modern continuous annealing line.

A vital factor in maintaining Empire's high quality for this steel is the exact control of temperature, time and tension of strip in the annealing process. Completely equipped with Clark-engineered control, the line can maintain speed of strip through the annealing section to an accuracy of better than ± 1%.

The line is designed for continuous operation at speeds up to 180 fpm, and will handle strip up to 42 inches wide, 22 gauge and lighter. Two 60-ft. looping towers, one at each end of the annealing section, provide storage for coil changes and permit the necessary speed match of entry and delivery sections to the processing section. A total of 1600 feet of strip is required to thread the line (with both looping towers full)—1300 feet are in the line under normal operating conditions.



Remotely-located control room showing main Clark control panel at left, Clark control center at right for AC auxiliaries.

The Wean Engineering Company, who furnished the line propulsion and cleaning equipment, selected Clark to design and build the controls.

Clark also furnished the synchronizing and tie-in control equipment for the annealing furnace and looping towers supplied by The Drever Company.

The **CLARK** **CONTROLLER** *Company*

Everything Under Control

1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

Largest bronze centrifugal casting ever made, 54¼" O.D. x 49½" I.D. x 346½" long. Charge weight—72,300 pounds.

At Sandusky,

GIANTS ARE ROUTINE...

Small wonder. We serve giant industries . . . paper-making, shipbuilding, metalworking, atomic energy, petro-chemical, and others . . . with centrifugally cast cylinders and tubular parts, many of which can't be made by any other process to the exacting standards required.

It's the 47 years of specialized experience coupled with unequalled manufacturing facilities . . . that makes it routine for our engineers and production teams to cast and machine *cylinders from 7" to 54" O.D. and up to 33 feet in length* . . . in a wide range of alloys meeting special performance requirements.

Do you need a giant cylindrical form . . . or a small one . . . machined to exact working dimensions? Send us your specifications; we'll reply promptly.

Sandusky Centrifugal Castings offer you 4 important advantages:

1. ***SUPERIOR MECHANICAL PROPERTIES*** —to meet exacting design requirements
2. ***UNIFORM SOUNDNESS***—free from harmful inclusions and porosity
3. ***HIGHEST QUALITY***—to insure long, dependable, trouble-free service
4. ***JOB-READY CASTINGS***—machined to your exact specifications, eliminate extra costs from rejects, down-time, loss of production

CENTRIFUGAL CASTINGS

Sandusky Foundry & Machine Company

SANDUSKY, OHIO • Stainless, Carbon, Low Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

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When you make anything in metal for homes, kitchens and appliances, and you want enduring beauty and sales appeal in your product . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

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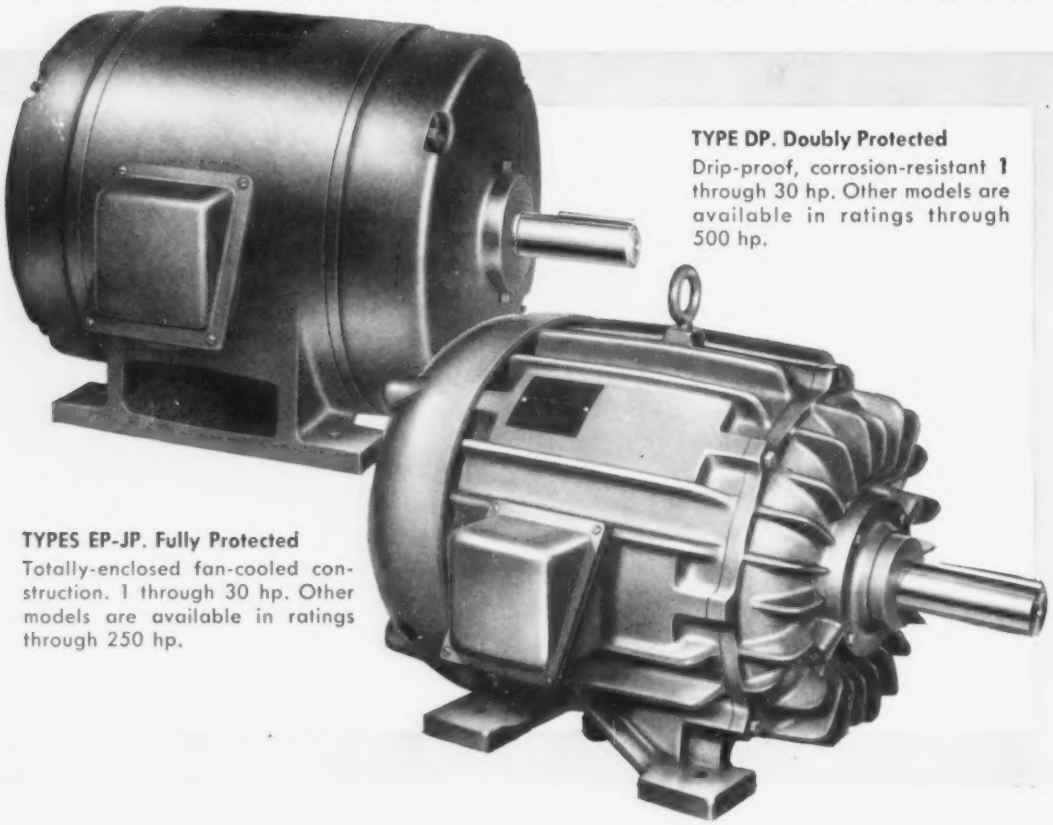
HIGH QUALITY SHEET AND STRIP

for homes and home products

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS

WAGNER ELECTRIC MOTORS...THE CHOICE OF LEADERS IN INDUSTRY



TYPE DP. Doubly Protected
Drip-proof, corrosion-resistant 1 through 30 hp. Other models are available in ratings through 500 hp.

TYPES EP-JP. Fully Protected
Totally-enclosed fan-cooled construction. 1 through 30 hp. Other models are available in ratings through 250 hp.

PRODUCTION GOES UP

when you power equipment with these Wagner Motors

Production is increased when motor down-time is reduced. To meet today's industrial demands for faster, more dependable production, Wagner has designed these industrial motors with *extra* protection that cuts time-out for motor maintenance to a minimum.

These motors pack more power in less space—1 through 30 horsepower in NEMA frame sizes 182 through 326 U.

EXTRA PROTECTION—Type DP is doubly protected by a rugged corrosion-resistant cast iron frame and by completely drip-proof enclosures.

Types EP and JP are totally enclosed against dust, grit, fumes or moisture—protected against corrosion by cast iron frames. Type JP is explosion proof as well.

COOL RUNNING—Both types are cool running. Blowers and special baffles direct cooling air through the DP motor. Types EP and JP are fan-cooled and are built with ribbed frames to increase the cooling surface.

LONGER BEARING LIFE—Original bearing lubrication will last for years in service under normal conditions, but openings are provided in the bearing housing to add fresh grease—remove old grease when required.

Let a Wagner motor application engineer show you how well these motors can fit *your* needs. Call the nearest of our 32 branch offices, or write us. Bulletins MU-202 and MU-203 give complete information on these Wagner Motors. Write for your file copies today.

Wagner Electric Corporation
SERVING INDUSTRY SINCE 1891

MS7-12

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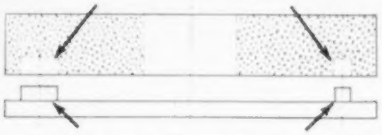
6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

Improved Gardner TRU-LOK® assures precision disc mounting for truer running

Molded, rigid plastic inserts in dowel holes now provide greater accuracy in mounting.



Dowel pins of different diameter in steel wheel must match holes in disc.

Gardner TRU-LOK eliminates run-out and vibration caused by off-center mounting. Disc can be bolted to steel wheel only in position established at time of disc manufacture.

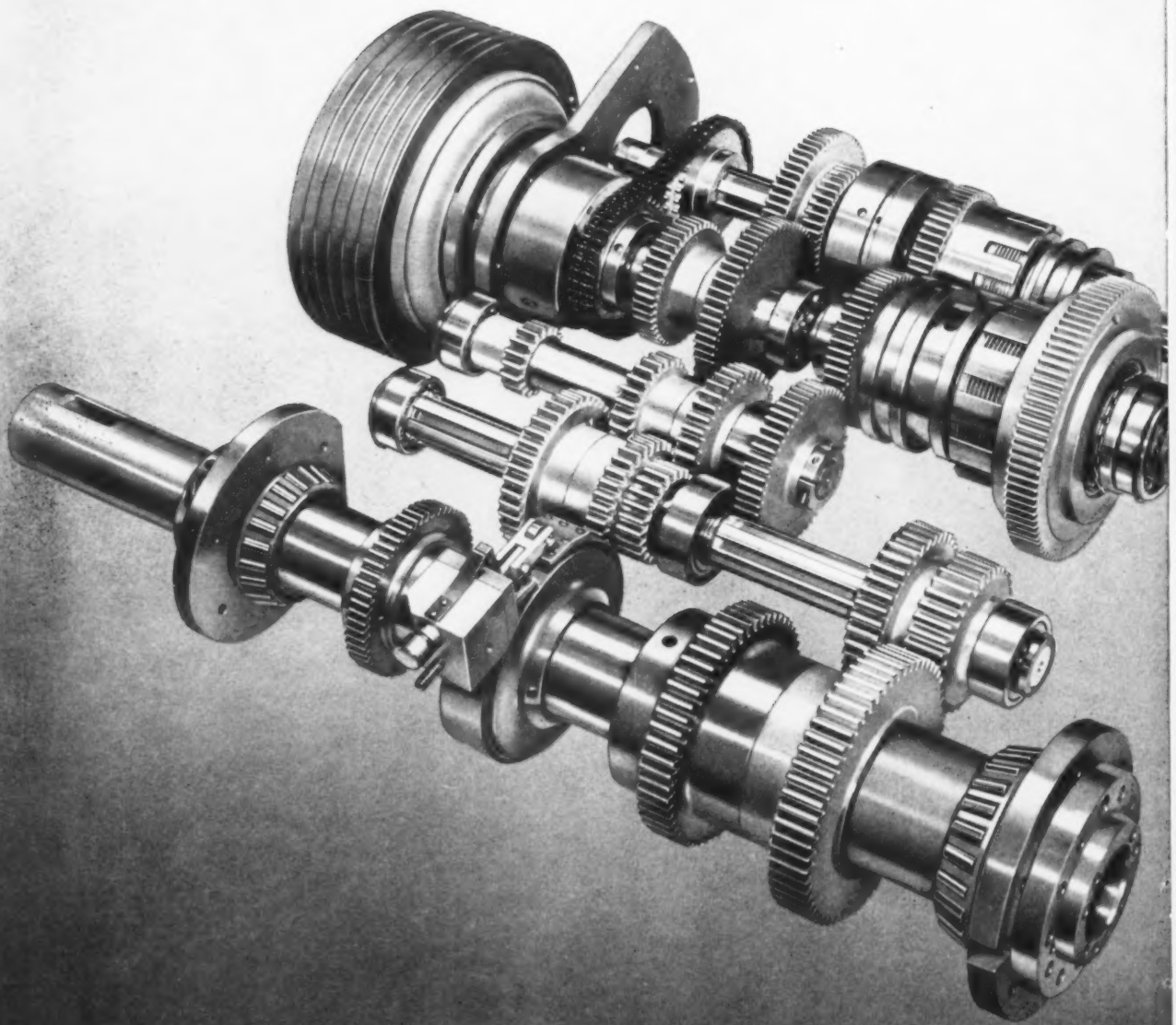
GARDNER

abrasive discs

BELOIT, WISCONSIN

The **power reserve** *and* **range of speeds**

YOU'LL NEED FOR THE



TOOLS OF TOMORROW

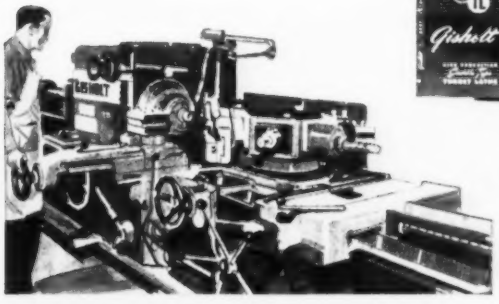
New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

GISHOLT MACHINE COMPANY

MASTERLINE GISHOLT SINCE 1887

Madison 10, Wisconsin, U.S.A.

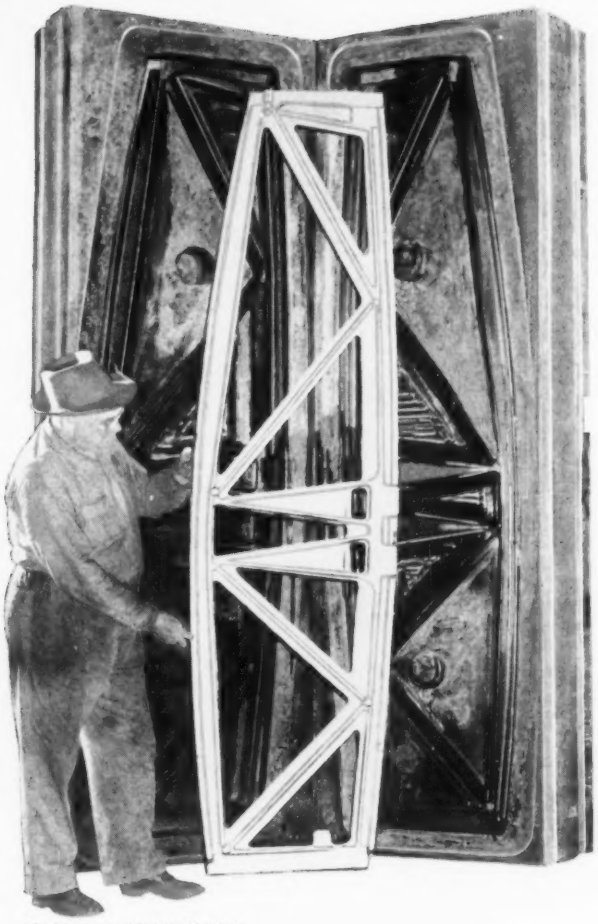
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

Roebling Royal Blue Wire Rope will **bend** and **bend** and **bend!**

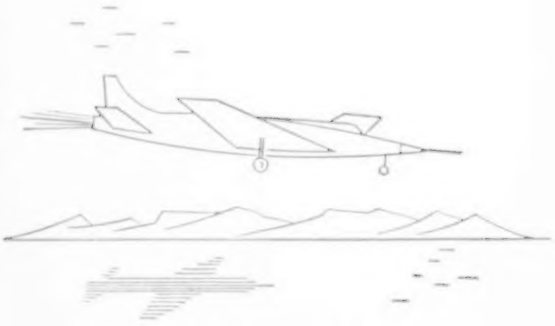
What's more, Roebling Royal Blue is *stronger* than the strongest wire rope previously available. It will do more work and last longer on *your* job. Call your distributor or your nearest Roebling office for full information about Royal Blue, the really better wire rope. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Distributors, Branches and Warehouses Throughout the Country—Subsidiary of The Colorado Fuel and Iron Corporation



COURTESY ALUMINUM COMPANY OF AMERICA



Increase Production

with FINKL DIE BLOCKS

...the aircraft industry does!

These two 14 x 35 x 114" FX die blocks, made from Finkl electric furnace steel, and weighing 15,800 pounds each, are used for producing precision aluminum landing gear rib forgings.

Finkl FX die blocks are noted for their long production runs and economy because:

- FX covers the full usable hardness range from Temper H (477-444 BHN) to Temper 4 (293-269 BHN).
- FX produces the greatest number of forgings per impression because its well balanced alloy content offers uniform hardness and freedom from temper brittleness. Relatively high tempering temperature promotes ductility and elimination of residual stresses.
- FX Special Machining Quality appreciably reduces shanking and sinking time.

These proved advantages can also mean savings to you with more pieces per die and better deliveries to your customers.

Save money by talking to a Finkl representative the next time you are considering die blocks or forgings.

DIE BLOCKS · FORGINGS · HOT WORK STEELS · ELECTRIC FURNACE STEELS

A. Finkl & Sons Co.

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Among the thousands of users—

THE DEMPSTER DUMPSTER® SYSTEM

Also Performs Important Materials Handling Jobs for this Prominent Electrical Manufacturer

One major use of the Dempster-Dumpster System in a large General Electric plant is for scrap materials collection. The Dempster-Dumpster Detachable Containers are placed in various areas, such as wire preparation and parts fabrication. When they are filled the truck-mounted Dempster-Dumpster, operated by only one man, the driver, picks up load, hauls and dumps in their scrap and salvage area . . . handling one-container-after-another. In a similar manner, this amazing low cost system also is used to collect waste materials around this factory. We at Dempster Brothers are proud to name the General Electric Company among the thousands of users of the Dempster-Dumpster System.

You, too, can reduce your bulk materials handling cost with this modern method — a flexible system that (1) enables you to obtain and use any required number of containers, each in the design and size to meet different material requirements, and (2) collect, haul, dump and/or transfer materials of every description with one truck-mounted Dempster-Dumpster operated by only one man, the driver. Write us today for complete information. Manufactured by Dempster Brothers, Inc.

THERE IS A DEMPSTER-DUMPSTER DETACHABLE CONTAINER AVAILABLE OR THAT CAN BE BUILT TO SUIT THE MATERIAL—be it solid, liquid, dusty, combustible, high temperature . . . waste or salvable, raw or finished product, and each, regardless of size up to 21 cubic yards or capacity up to and over 36,000 lbs. payload, can be handled by one truck-mounted Dempster-Dumpster with only one man, the driver! Savings are tremendous!

DEMPSTER BROTHERS
creative engineers
successfully exploring new ideas to reduce your materials handling costs with the.....
DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS, 467 N. Knox, Knoxville 17, Tennessee

Something new... made better by aluminum

Loaded aluminum cars were crashed together again and again at Aluminium Limited's laboratories in Kingston, Ontario. Even a million pounds of impact failed to damage these rugged cars.

New aluminum hopper cars withstand million-pound punch ...increase payloads up to 16%

WITH ITS GREAT SUCCESS in new passenger trains, it was natural to think of aluminum for freight cars. Aluminum cars would mean heavier payloads . . . trains 16% longer hauled by the same locomotive. Lightweight cars would also reduce track wear and switching costs. And, of course, aluminum's corrosion resistance would provide substantial maintenance savings.

Tests Prove Strength

But would aluminum cars be rugged enough for this service? The answer – a definitive *yes* – was uncovered by Aluminium Limited's research facilities. In recent tests aluminum hopper cars withstood up to a million pounds of impact . . . far more than is ever encountered in a lifetime of service.

Growing Fabricator Markets

With all these advantages, aluminum is sure to play an important role in modernization and replacement programs for America's fleets of 2,000,000 freight cars. With this and other structural applications, aluminum fabricators are sure to find ever-increasing markets.

Through research and engineering, Aluminium Limited is continually working to develop new uses and markets for aluminum. To match the growing demand, production capacity in Canada is expanding to reach a level of 1,000,000 tons annually by 1960.

Supplying U. S. industries with primary aluminum from Canada

Aluminium Limited *Sales, Inc.*

630 FIFTH AVENUE · NEW YORK 20, N. Y.

CLEVELAND · CHICAGO · DETROIT · LOS ANGELES · BUENOS AIRES · SÃO PAULO

Know a better name than "Spade"?

(It certainly isn't "Heavy-Duty, Super-Powered, Raised-in-the-Sand Trowel"!)

Same goes for lathes! Why call a lathe a 16″ machine, when it may swing 18½″ over the bed and only 12½″ over the cross slide—more or less? Especially when most lathe types are used largely for between center work? Monarch is proud to be a part of the Lathe Group that has performed a real service to lathe buyers by proposing the commonsense, informative four-digit designation system. And *we're* going even further. Henceforth every Monarch model designation on new lathes will give you a complete description at a glance!

The Four-Digit System

This is simplicity itself. The first two digits reveal swing or clearance over bed and carriage wings. Second two digits, swing over cross slide on the basic machine. A reference to the chart shows how immediately informative this is.

Raising—and Heavy Duty Information

Now, you know where you stand with Monarch—as in contrast with such practices as calling a basic 20″ machine a 20″ heavy duty, then raising it to 25″ and calling the raised model a 25″ standard.

All Monarch lathes designated "Heavy Duty" are engineered heavy duty machines—and the specifications reveal the weight, power, and capacity to justify the term. Where engineered raises in the sand are involved, the basic designation will be used, followed by a dash and the raised clearance. For example, the first raise of our Model 4025 Heavy Duty will be expressed as Model 4025-31 Heavy Duty. Simple! Clear! Understandable! Factual!

The "Engine" vs "Toolmaker's" Doubletalk

The fact that these terms still exist at all is a tribute to the force of habit. For years, we've only made one grade of lathe—the best within our power. Every machine has the utmost in built-in precision and production because the close manufacturing limits of today are equal to and often surpass the toolroom limits of yesterday, while high labor rates make it essential that toolroom operations be placed on the highest possible productive basis. It is true that a lathe for toolroom use must, as a rule, have more flexibility than one for manufacturing purposes. So, on many models, we furnish a standard complement of additional equipment. Machines with such equipment differences are designated with the suffix "T". Model 1610 becomes Model 1610-T. As for the word "Engine" applied to a lathe, it lost meaning years ago. Let's bury it!

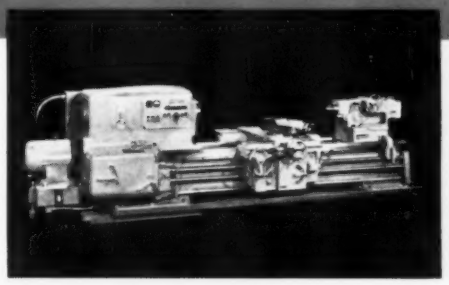
In a Nutshell...

Now you know how to appraise the swing capacity of every Monarch Lathe at a glance. We hope the day will come soon when the same nomenclature will apply to all lathes made. Then nobody will have to dig for the facts—The Monarch Machine Tool Company, Sidney, Ohio.

SIZE DESIGNATIONS

Machine	New Four-Digit System	Outmoded Size Designations
Series 62 Preselector Dyna-Shift	1610	13″ Engine
	1610-13	13″ Raised Engine
	2013	16″ Engine
	2013-16	16″ Raised Engine
	2516	20″ Engine
	2516-19	20″ Raised Engine
Series 80 Heavy Duty Dyna-Shift	2516	20″ Heavy Duty Engine
	2516-20	20″ Heavy Duty Raised Engine
	3220	25″ Heavy Duty Engine
	3220-24	25″ Heavy Duty Raised Engine
	3220-28	25″ Heavy Duty Raised Engine
Series 90 Heavy Duty Dyna-Shift	4025	32″ Heavy Duty Engine
	4025-31	32″ Heavy Duty Raised Engine
	4025-36	32″ Heavy Duty Raised Engine

NOTE—Older models, namely Model EE Manufacturing and Toolmaker's, Series EE-Model 1000, Series 61 Engine and Toolmaker's Lathes and Models M, N, and NN Heavy Duty Engine Lathes will retain old designations because of long-established user acceptance. The suffix "T" after the following model designations denotes inclusion of additional equipment usually required for toolroom use—1610, 1610-13, 2013, 2013-16, 2516, 2516-19.



For Example:

Monarch Series 90 Heavy Duty Dyna-Shift—Model 4025-31
Basic Clearance over Bed and Carriage Wings—40″
Basic Swing over Cross Slide—25″
Raised Swing over Cross Slide—31″

Monarch
TURNING MACHINES
ACCURACY • ECONOMY • LONG LIFE
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

Range-burner manufacturer does

REPUBLIC ELECTRUNITE

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

everything but tie knots in this STEEL TUBING

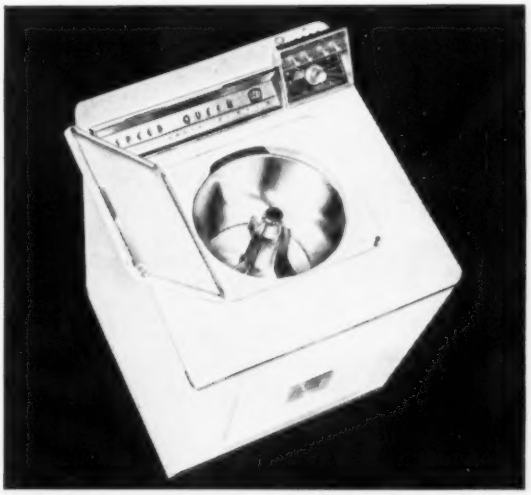
First, there's a hairpin bend to a 1¼-diameter radius! Then a 4-way crimp to form a finned venturi! Next some punching and notching! Followed by welding!

This is how Harper-Wyman Company turns Republic ELECTRUNITE® Carbon Steel Tubing into the lightweight, easy-to-clean venturi burner tubes used on scores of famous-name gas ranges.

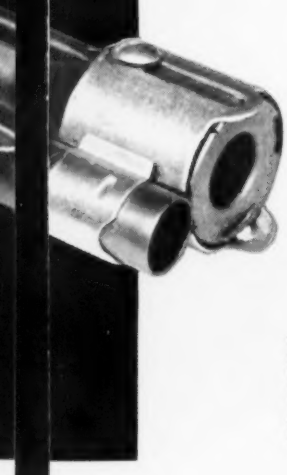
All these severe bending and crimping operations depend on close tolerances on the O.D. and the I.D. of the Republic Steel Tubing to avoid die and mandrel troubles. Uniform, predictable ductility is a must to avoid stretch and collapse as the tubing is severely bent and formed.

Republic ELECTRUNITE Steel Tubing is uniform in wall thickness, fully concentric, and can be furnished with smooth surface finish inside and out. It is supplied in a full range of sizes, wall thicknesses, grades, and ductilities to meet any of your fabricating requirements. Dollar for dollar, your best tubing buy is Republic ELECTRUNITE, the *original* electric-resistance-welded tube.

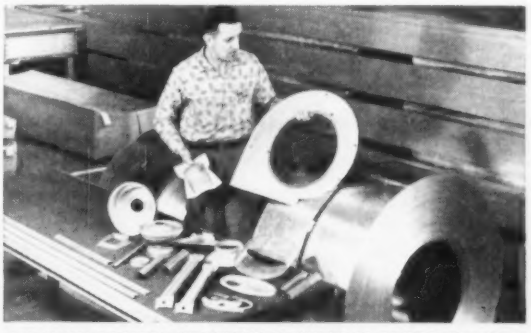
Let our engineers help you design Republic ELECTRUNITE Steel Tubing into your products to speed production, cut costs, eliminate excess weight and improve product performance. Fill in coupon and mail today.



VOLLRATH COMPANY MAKES STAINLESS STEEL WASHER TUB IN ONE DEEP DRAW. For the Speed Queen automatic washer, Vollrath craftsmen start with a circular blank of Republic ENDURO® Stainless Steel. Then, in a single operation, they deep-draw the blank into a tub in which diameter of the blank is reduced 50%. Proof of ENDURO's ductility and workability! Installed in the Speed Queen washer, the stainless tub adds sales appeal, promises lifetime service. Where can you use ENDURO to improve product or process? Republic metallurgical help is yours for the asking.



TWO-YEAR-OLD DRIVER TESTS NYLOK NUTS. They are used at several critical points of the Taylor Tot manufactured by The Frank F. Taylor Co., assuring positive locking even under severe shock, vibration and tension. Republic Nylok Nuts lock whether seated or not, protecting painted surfaces and soft metals. Positive locking assured wherever you stop wrenching. Even a two-year-old can't shake 'em loose. Want test samples? Write Republic, indicating size needed.



GET ZINC COATING PROTECTION WITHOUT COSTLY DIPPING AFTER FABRICATION. You can, with Republic Continuous Galvanized Steel. That tight, corrosion-resistant zinc coating will not crack, flake or peel under any forming process permitted by the base metal. Result is long-lasting protection without costly dipping. And, further finishing can be eliminated. Get the facts on this new production-line material, available in sheets and in rolls. Send coupon today.

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- ☐ Republic ELECTRUNITE Mechanical Tubing
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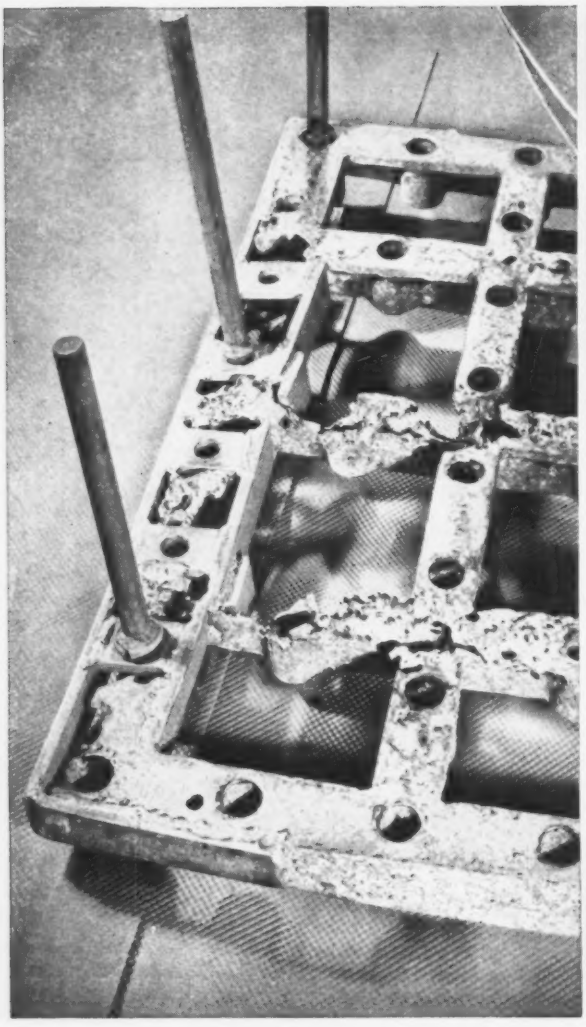

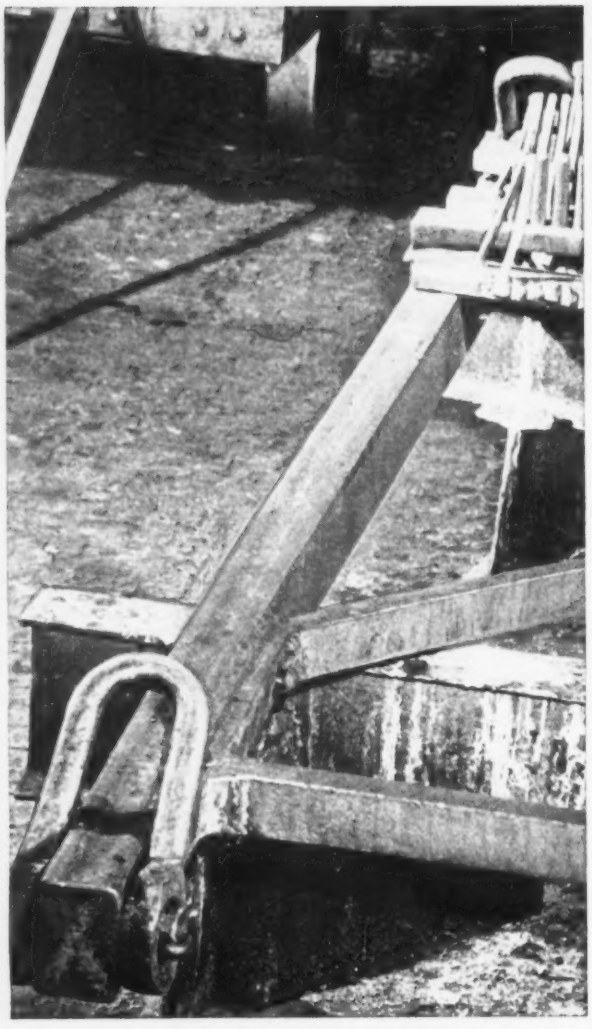

Pick the Monel Alloy pickling crate

You can see at a glance which crate is Monel® nickel-copper alloy. It's at your right . . . and is almost 30 years old!

You can also see which crate maintains its strength and stands up against acid corrosion by the pickling bath.

But in the early stages both crates would have appeared equally strong.

In the early phase of acid attack, de-zincification – or de-aluminification – remains unseen. Only a fraction of the original strength is left. The weakness shows up later as corroded "honeycombed" metal.

Monel alloy on the other hand cannot de-zincify. It is a solid alloy of nickel and copper.

In one public test, after exposure for 2,448 hours to 5% to 7% H_2SO_4 at 180 F., Monel alloy tie rods tested better than three times as strong as the next best metal under test.

In actual use, Monel alloy pickling crates maintain their strength and ability to carry extra heavy loads for years on end. Monel alloy strongly resists attacks by most of the common pickling solutions.

Monel alloy pickling equipment is wrought metal.

It can be fabricated to any practical design. And is easily repaired by welding for extra years of service.

Send for "Equipping the Pickle House for Greater Production at Lower cost." Write today!

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The International Nickel Company, Inc.
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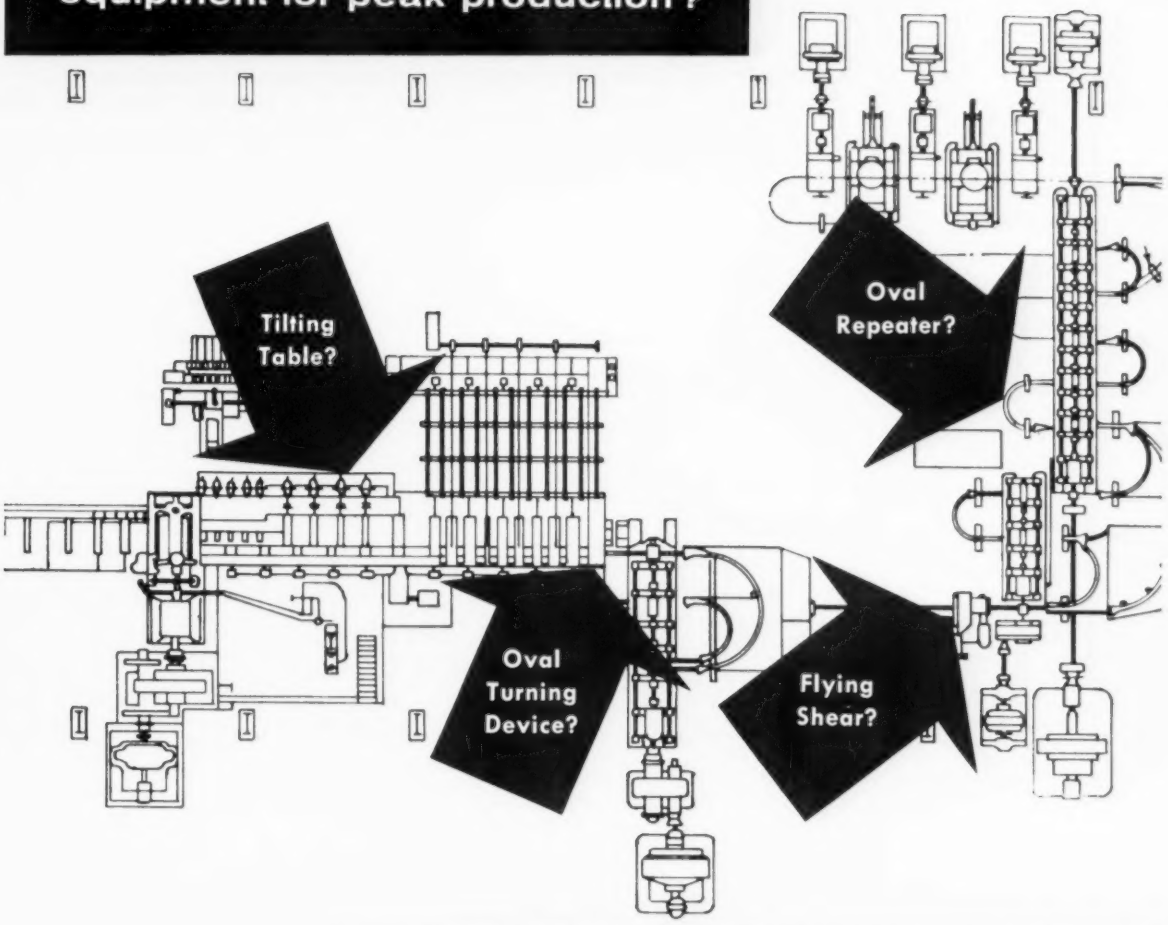
INCO Nickel Alloys

Monel . . . *for proved pickling life*

What station in your mill needs specially designed equipment for peak production?



From auxiliary units to complete mills, look to BIRDSBORO for new ideas in design and production

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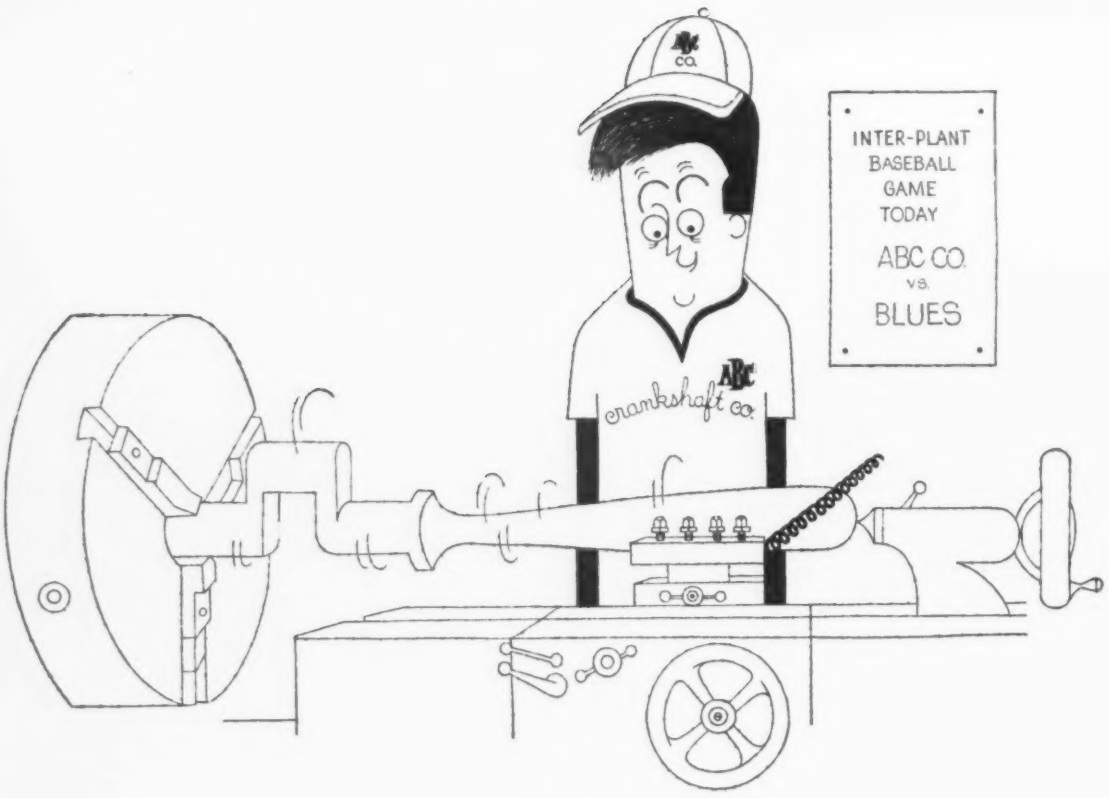


Have a metal turning problem?

THE SOLUTION MAY BE A FAMOUS REX HIGH SPEED STEEL. REX IS THE STANDARD BY WHICH ALL HIGH SPEED STEELS ARE COMPARED — AND IT'S AVAILABLE FROM ALL LOCAL CRUCIBLE WAREHOUSE STOCKS.

Crucible REX M2-S, for example, has a wide hardening range. Although REX M2-S costs less, its red hardness is equal to the 18-4-1 type. And its superior toughness and good wear-resistance help make it ideal for many cutting, turning and broaching operations.

REX is just one of dozens of tool steel grades and types regularly stocked at all local Crucible warehouses.

What's more, Crucible warehouse service offers you unlimited assistance in selection or fabrication of special steels. And Crucible is the only specialty steel producer *fully integrated to the point of use*. That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

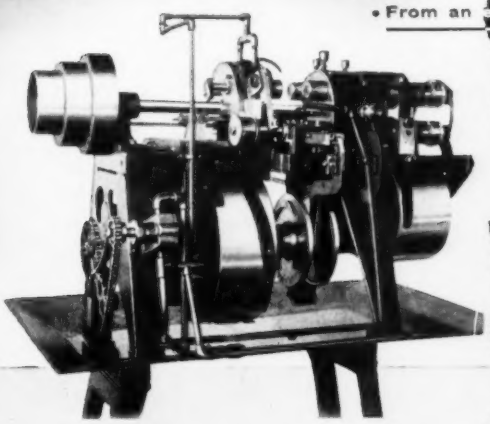
CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

Thanks, Mr. Keebler...

You have said it better than we could!



First successful multiple-spindle automatic—the granddaddy of *all* of today's "multiples"—developed and built by National Acme in 1893.

• From an editorial in April, 1957 **AUTOMATION**

by JAMES C. KEEBLER, Associate Editor

...ing ... much this tubing annually that the price

Those who think of automation only in terms of production techniques developed since Harder first uttered the magic word *Automation* are thumbing right past a few useful rules. If we aren't careful these newly trained manufacturing engineers will be overlooking a few tricks that have been in the trade since Hector was . . .

Overpublicizing the new developments might overshadow the fact that the methods developed long ago fit the pattern of present-day automation techniques and therefore should not be overlooked in evaluating possible production processes.

A case in point is the automatic screw machine used on these bearing rings. This machine development was placed on the market in the 1890's and incorporated such sound basic automatic machine thinking that it remains primarily the same in principle in its 1957 model.

On these machines are performed in succession and without manual attention virtually all of the circular machining operations required on ball bearing rings. This is automation. Just because the technique is not new is no reason why it should not be given its just place in the galaxy of automation studies.

more ...ors, air ..., etc., ...bear- ...ulti- ...ear ...ber ...igh ...ound ...ern to ...Inner ...m ...le ... used

• History has recorded the machine tool development about which Mr. Keebler writes as the direct prototype of present day Acme-Gridley Multiple Spindles—in fact, it's the granddaddy of *all* of today's "multiples".

• Since the inception and development in 1893 of the first successful Four Spindle Automatic Screw Machine, National Acme has extended the inherent circumferential automation principle of its basic design to six and eight spindle machines. These machines have set the pace with which to meet, head-on, industry's need for greater and less costly production.

• Knowing that the future will make ever greater demands on circumferential automation, National Acme will continue to expand applications for Multiple Spindle Automatics. Who knows?, some day the line may include not only 4, 6 and 8 spindles, but 12 and 16 spindle machines as well.

National Acme

THE NATIONAL ACME COMPANY, 175 E. 131ST ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.

Morgan Engineering Co.

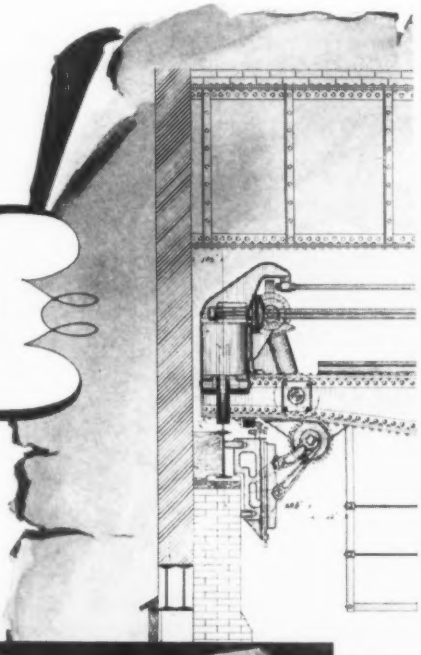
...at the vital spots maintaining continuous,

Wherever steel is made, huge blocks of metal are worked or great weights must be lifted, you find the nameplate . . . "Morgan—Alliance, Ohio—USA"... famous for advanced design in cranes since 1878.

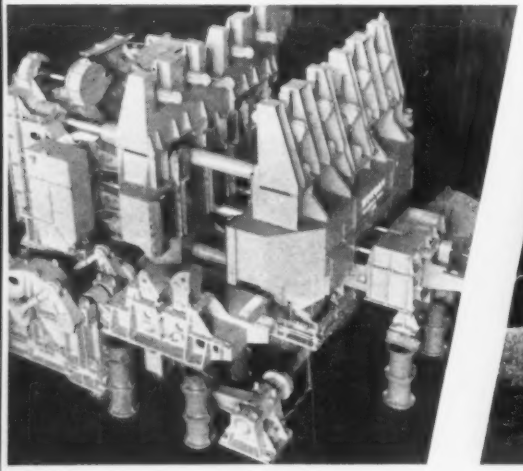
Today, through years of far-sighted research and sound engineering, many other types of Morgan mill equipment are equally well known. Mills, roller tables, shears, saws, presses and auxiliary equipment built by Morgan offer the same fine performance standards.

New speeds and efficiency, greater capacities, lower operating and maintenance costs are characteristic of all Morgan-built equipment. Each design advance reflects close contact with your requirements . . . and Morgan Engineering Company's unusual talent for anticipating and

FREE REPRODUCTION—*A 14" x 20" reproduction of this 1888 Morgan Engineering drawing is available for framing. Kindly mail request on company letterhead.*



TODAY *you find the name "Morgan" on all types of mill equipment . . . handling the big jobs and the tough ones. Shown below: open hearth charging machine and gag straightener for 36" beams.*



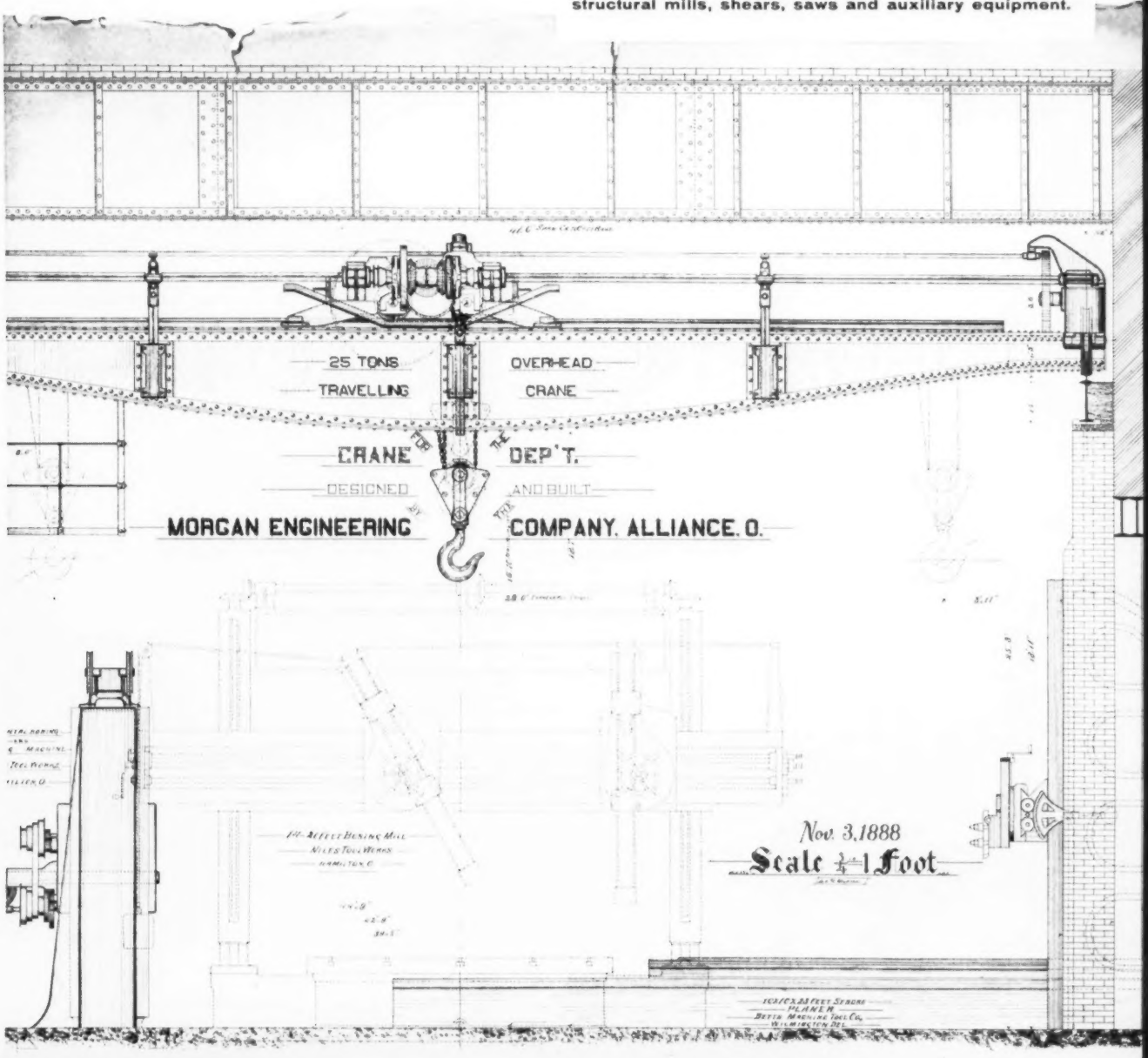
lower cost production

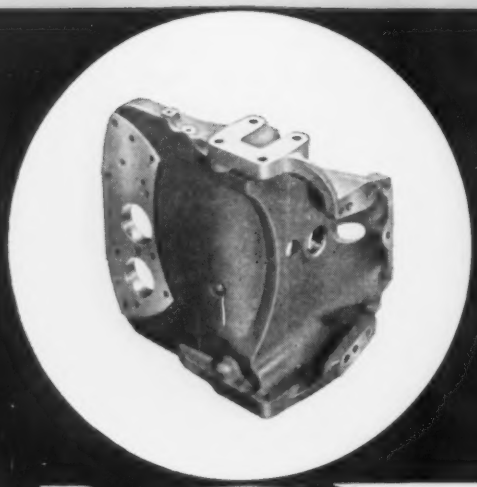
solving problems of the fast-growing metals industry.

Quality craftsmanship in every detail is a tradition that pays off in efficient, uninterrupted production in your mill operations. Let our representative show *you* how to speed production and lower costs with Morgan mill equipment.

THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws and auxiliary equipment.





At Massey-Harris-Ferguson

Natcos Save 100 Parts...

Three multiple-spindle Natcos bore, drill, spotface and tap the front end support for a Massey-Harris-Ferguson tractor

NATCO

60 Man Hours Every

on Rugged Axle Support Castings

Massey-Harris-Ferguson checked it two ways. Nine general-purpose machines would do the job—or 3 Natcos. They chose the Natcos for these reasons:

- *Saving of $30,000 in machine cost*
- *Saving of 60 man hours every 100 parts*
- *Saving of 65% in floor space*

The Natcos handle all drilling, boring, spotfacing and tapping—a total of 67 operations on the 182-pound front axle casting. The casting is heavy, irregular—tough to fixture and clamp. The Natcos meet production requirement of 11 parts per hour.

Natco provided complete tooling which features automatic clamping, cycling and chip blow-out. All three machines are of unitized construction, giving Massey-Harris-Ferguson the flexibility to run different parts of redesigns of the same part.

Let Natco Field Engineers point out cost-saving and time-saving methods on your next drilling, boring, facing or tapping job. Natco offices are located in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

National Automatic Tool Company, Inc.

Richmond, Indiana

Multiple-spindle drilling, boring, facing and tapping machines. Special way-type, index and transfer machines.

Number 2 in a Screw Research Association Series on Industrial Statesmen

ERNEST SWIGERT

stresses the importance of quality

"In the final analysis, the quality of any product depends on the pride and integrity of the maker. A reputation for quality, once acquired is like the 'Sterling' stamp on silver — an assurance to the user that the product will live up to his expectations. To adhere consistently to high standards regardless of competition is industrial statesmanship at its greatest, and also the best course for continued success."

Ernest G. Swigert

President, National Association of Manufacturers
President, Hyster Company

Product Reliability for YOU in the Quality Control of Phillips Screws

There are many manufacturers of Phillips Cross-Recessed Head Screws. It is important for you to know that some of them are members of Screw Research Association for this major purpose:

To make sure that the quality of their products remains the very highest, regardless of competition. They accomplish this by rigidly controlling manufacture according to standards set up by Phillips Cross-Recessed Head Standards Committee.

Product reliability in Phillips Screws demands that they be entirely trouble-free — and that they deliver every advantage inherent in the Phillips Recess design. Recess dimensions must meet the close tolerance standards established by the Phillips Cross-Recessed Head Standards Committee.

Phillips Screws made by these companies improve your products. They also reduce your production costs.

Members of Screw Research Association . . .

American Screw Company • Atlantic Screw Works, Inc. • The Blake & Johnson Co. • Central Screw Company • Continental Screw Co. • Elco Tool and Screw Corporation • Great Lakes Screw Corp. • The H. M. Harper Company • The Lamson & Sessions Company • National Lock Company • The National Screw & Manufacturing Company • Parker-Kalon Division, General American Transportation Corporation • Pheoll Manufacturing Co. • The Progressive Manufacturing Company Division, The Torrington Company • Scovill Manufacturing Company • Shakeproof Division Illinois Tool Works • The Southington Hdwe. Mfg. Company Sterling Bolt Company • Universal Screw Company • Wales-Beech Corporation

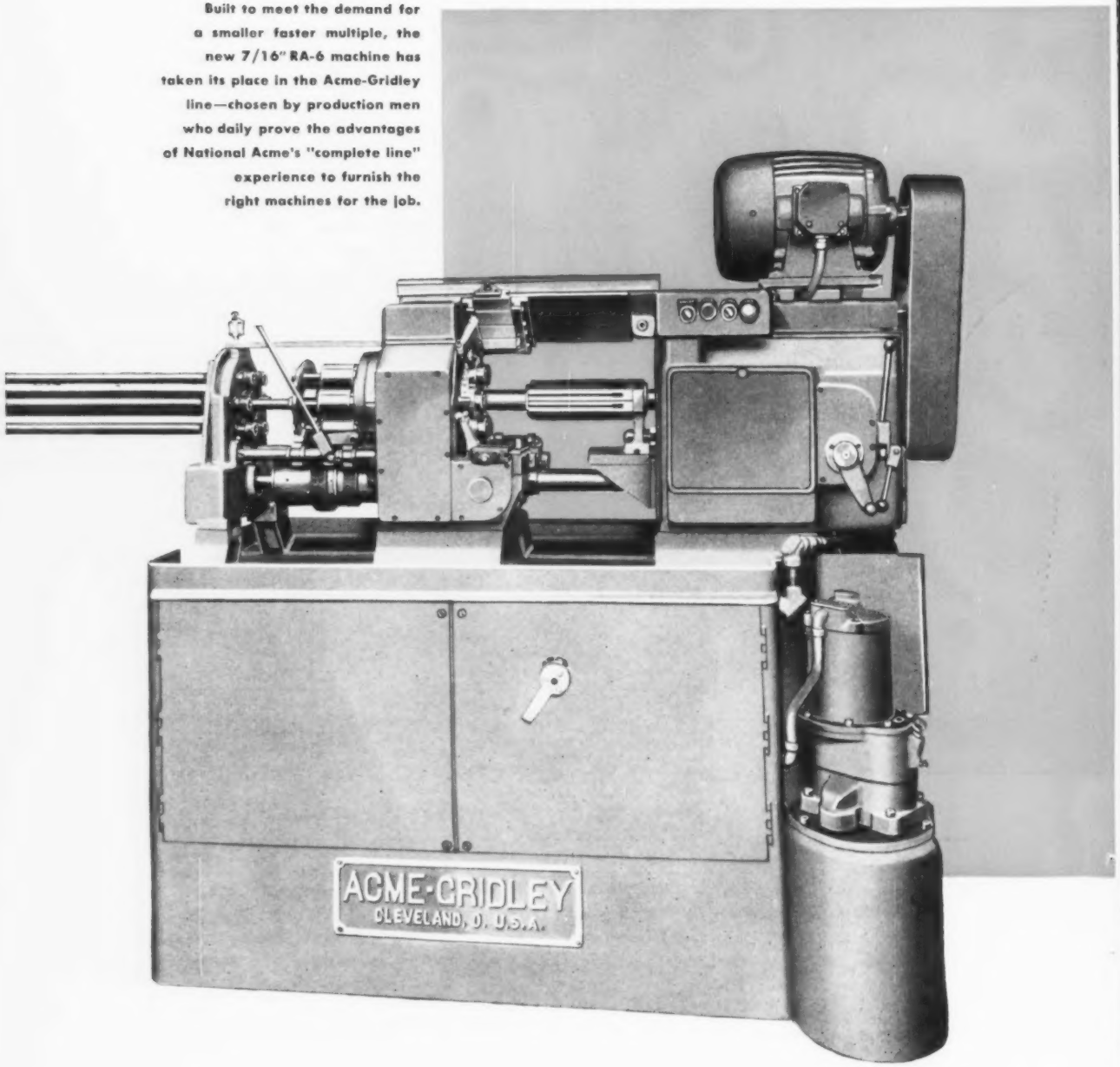
You can rely on these sources . . . for product reliability

LIKE ALL

Acme-Gridley

BAR AUTOMATICS . . . .

Built to meet the demand for a smaller faster multiple, the new 7/16" RA-6 machine has taken its place in the Acme-Gridley line—chosen by production men who daily prove the advantages of National Acme's "complete line" experience to furnish the right machines for the job.



. . . THE NEW 7/16" SIX

gives you lowest cost per piece

HIGH PRODUCTION ACCURACY—sustained at highest speeds and feeds through proper weight distribution and support of toolholders without overhang.

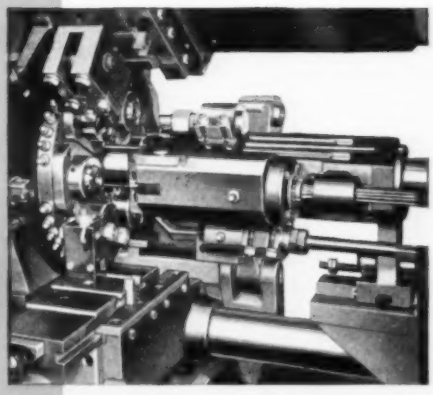
WIDE TOOLING VERSATILITY—through independently operated cross slides, spindle stopping (optional) and a variety of standard and special attachments.

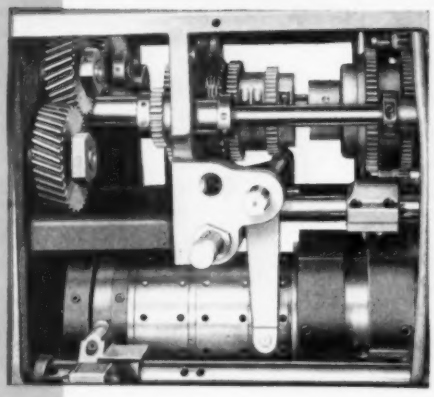
LONG OPERATING DEPENDABILITY—with extra reserve power and strength for top performance with *all* tools.

★ ★ ★

Let our representative show you how Acme-Gridleys can work for you; meanwhile, *write for your copy of* MRA-56 *for specifications of the new 7/16" Six.*

Unusually large tooling zone permits ready access for installation and adjustment of tools and attachments. All slides are wide and heavy, providing maximum support without overhang.





Gear box section accommodates drive control for all accelerated end-working attachments, spindle speeds and feeds . . . easily accessible through large openings on either side.

INDEX . . . to lower machining costs... with *Acme-Gridley* **CONTROLLED CYCLE**

National Acme

THE NATIONAL ACME CO.
175 EAST 131ST STREET
CLEVELAND 8, OHIO

Sales Offices . . . Newark, N. J. . . . Detroit, Mich. . . . Chicago, Ill.

Steel that goes into this bumper, being installed on one of America's fine cars, is ordered and tested to rigid specifications. The steel must be exceptionally clean, bright, flat, and with no surface defects. It must have close chemical analysis and internal quality so it will draw deeply without "orange peel." The company installing this bumper is so careful that in the last ½ million bumpers it has scrapped only ½ of 1% due to metal failure! Pittsburgh Steel's sheet constantly meets these exacting specifications.

Pittsburgh Steel's quality standards pay off as automakers in a highly competitive market demand...

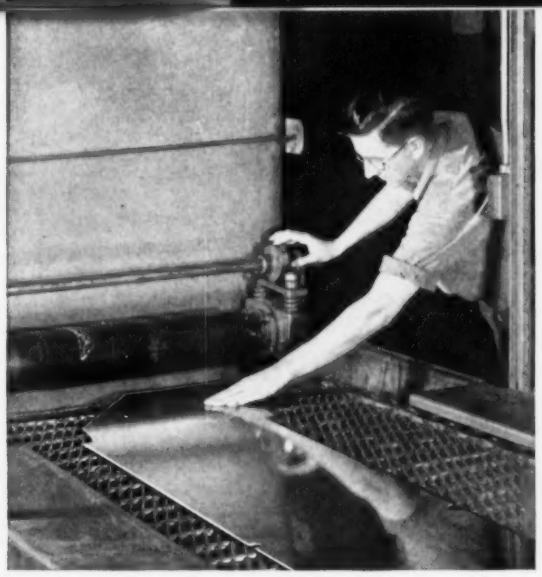
Better Sheet Steel For Making Bumpers

Today, the makers of America's better cars are more than just critical when they specify steel for making bumpers. They realize that the broad and complex chromed areas front and back on their models must enhance the appearance of the cars if they expect to beat competition in today's tight market. They demand the best, and then test exhaustively against strict specifications to make sure they get it.

That's where Pittsburgh Steel Company shines. With its outstanding new cold rolling facilities backed up with the latest technology, it daily produces sheet for a variety of the toughest applications. When an automaker says of its bumper stock that yield must be held to 30-33,000 psi, and elongation must be 38% before failure—that's duck soup for Pittsburgh Steel. Orders like this come from one company that prides itself on less than one-half of one percent of scrap due to metal failure in the last half-million bumpers!

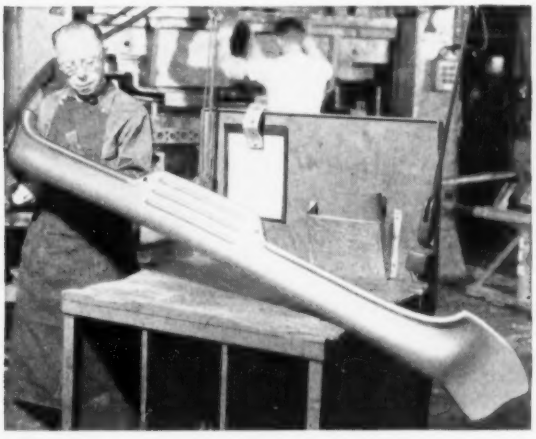
One bumper plant inspector put it this way: "We have to be especially careful to watch steel quality because, although the draw isn't unusually deep on wrap-around bumpers, it is very critical since it involves complex bends up to 120°. And even the tiniest stretcher-strain marks or other defects would show up like a sore thumb under the bright chrome finish."

If Pittsburgh Steel's sheets can meet standards as high as these, they can help you solve your forming problems, no matter how tough they may be. When you buy from Pittsburgh Steel you can always be sure you are getting sheet that has:



Grinding provides a surface finish which must not deviate more than 10 micro inches and since rarely more than 2% is taken off, the original sheet surface had to be excellent.

The draw of this massive press is critical since complex angles up to 120° must be achieved without steel failure. Sheet steel supplied by Pittsburgh Steel Company has excellent formability which stems from good internal quality.



After all drawing and stamping operations are complete, each bumper is carefully inspected before going to the plating line.

Each bumper gets a last close look after plating. The bright finish magnifies any defects so the surface must be perfect.

- **Superior Internal Quality**—proper uniform grain structure free from flaws and subsurface imperfections.
- **Good Surface**—clean, bright and smooth—free from scratches, pits and slivers.
- **Flat and Uniform**—consistent from sheet to sheet to save you scrap.
- **Formability**—excellent capacity to withstand deep drawing.

There is an experienced Pittsburgh Steel Company sales engineer as close to you as your telephone. He is at your service—eager to help you solve your toughest sheet problems.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

You Get MORE

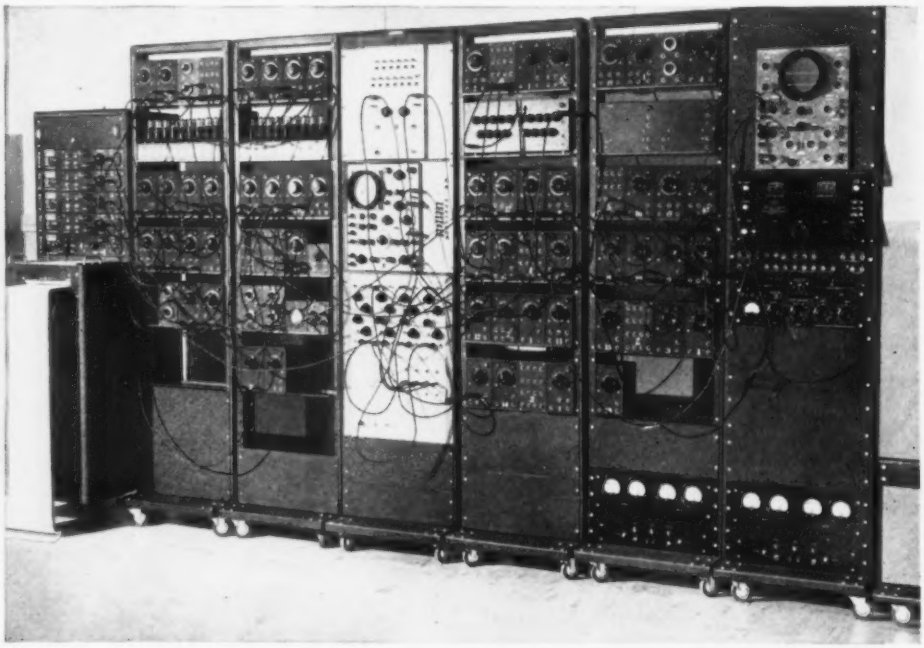
...because ALLIS-CHALMERS "COORDINEERS" the Entire System

EFFECTIVE regulation is more than a matter of good regulator design. It embraces overall *system* design... the integration of interdependent components — generators, exciters, motors, regulators and other control equipment. As manufacturers of a most diversified line of electrical generation, distribution and utilization equipment, Allis-Chalmers, of course, is in a unique position to provide this practical approach to mill regulation.

Allis-Chalmers maintains separate departments, staffed by research, design, manufacturing and application specialists for each product. "Coordineering" results from an interdepartment exchange of ideas and technical information correlated in *one* department specializing in metal producing industry application. In this department, components are matched to meet the requirements of your job. Responsibility for *system* performance rests with one company.

Analytical Facilities Utilized...

System performance is simulated in the computers to get optimum configuration of components. Time constants and exciter ceilings necessary for desired response are established.



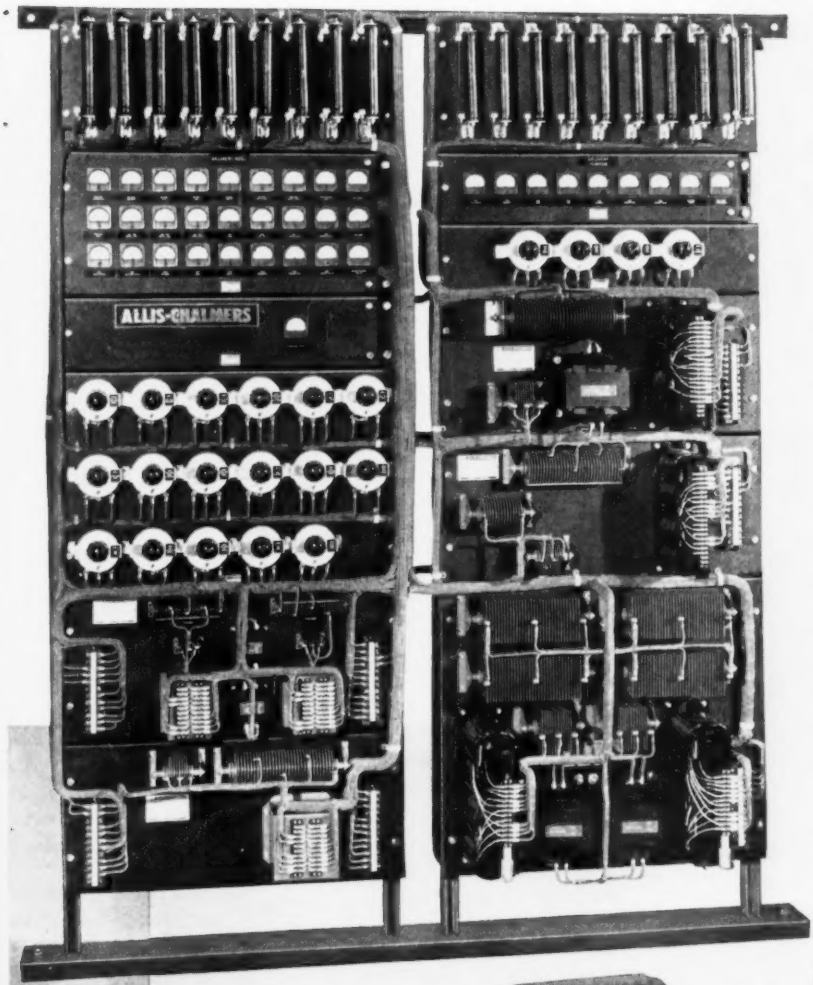
LIVE BETTER ELECTRICALLY

Regulex is an Allis-Chalmers trademark

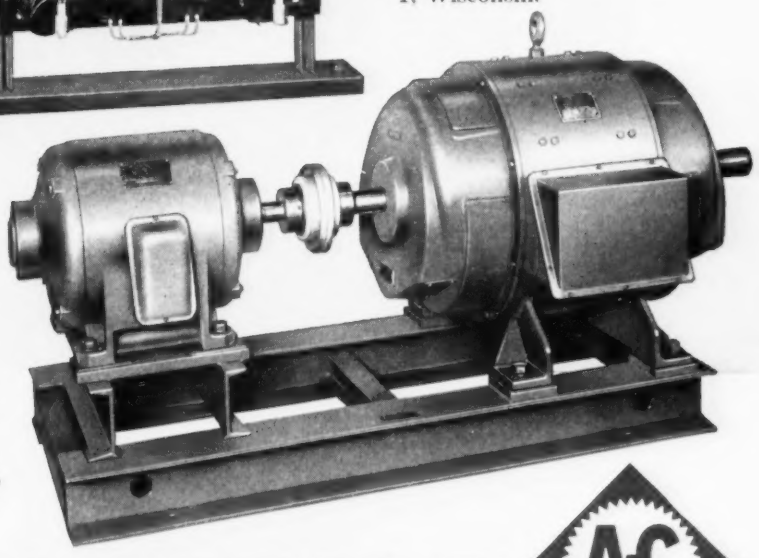
ALLIS-

Efficient Regulation

ALLIS-CHALMERS
Regulators



Magnetic Amplifiers



Regulex Rotating Amplifier

For MILL CONTROL

Three Types Available

1 ***REGULEX* Rotating Amplifier** — Applicable where high power levels for reversible output are desired.

2 **Magnetic Amplifiers** — Applicable where low power levels for reversing or high power levels for non-reversing are desired.

3 **Combinations of Rotating and Magnetic Amplifiers** — Each complements the other for maximum regulating efficiency.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

CHALMERS

A-C ALLIS-CHALMERS

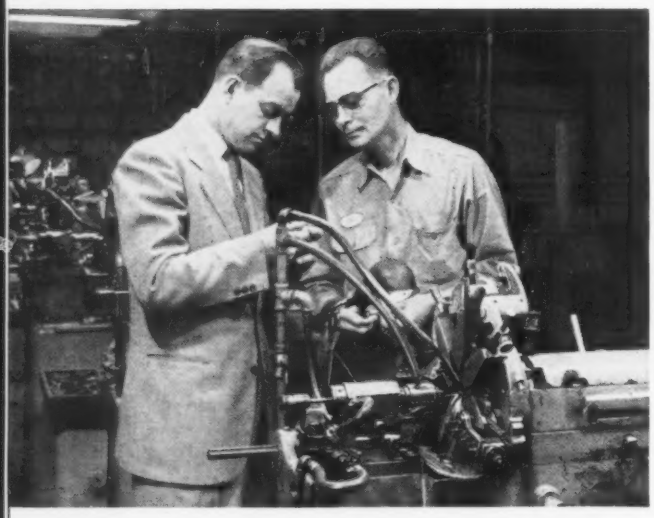
A-5030

Three case histories

How 3 companies improved production by changing to

STANICUT Cutting Oils

Here are reports on three companies that have recorded (1) increases in production (2) better machine performance (3) longer tool life (4) money saved by switching to a STANICUT *Cutting Oil suited to their operations. You can get similar results.*



Standard Oil industrial lubrication specialist, Ray Wells, and Stuart Bergsma, G. A. Brevik manager, inspect carburetor needle valve. Ray recommended plant's switch to STANICUT Oil 137 BCS. He is well qualified to make such recommendations. Ray is a graduate of the Illinois Institute of Technology with a degree in engineering, and he has completed the Standard Oil Sales Engineering School. He has been an industrial lubrication specialist at Standard for six years.

G. A. Brevik Manufacturing Company uses STANICUT Oil 137 BCS

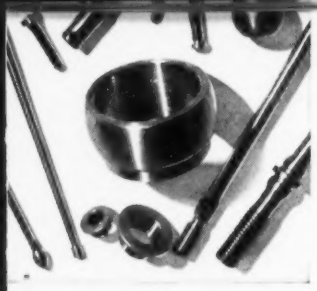
G. A. Brevik Manufacturing Company, Prescott, Michigan, is the largest producer of carburetor needle valves. The company was blending its cutting fluid from four different oils. Still they experienced tool breakage and ring formation on the surface of the stainless steel they were machining. Then one machine was converted to STANICUT Oil 137 BCS to test the oil's suitability for this operation. Soon all machines were converted.

Production increased 25% because of the improved performance of the machine tool. Cutting oil inventories have been reduced from four different oils to one. Tool life has been extended. There is no variation in fluids as there was when four oils were being blended, and there is no messy blending operation.

STANICUT Oil 137 BCS is ideally suited for severe, high speed machining.

A few of the stainless steel parts machined on automatic lathes at G. A. Brevik Manufacturing Company using STANICUT Oil 137 BCS.

STANDARD



Some of the pieces manufactured by Dearborn Centerless Grinding Co. Materials used are stainless steel, Inconel and Nichroloy.

Operator George Laverdiere and Standard Oil lubrication engineer, Leland J. Loomis, examine piece just off Cincinnati centerless grinder. Lee Loomis is another man who knows how to advise on metalworking problems. Lee has had ten years' experience in such work, has an engineering degree from Tri-State College and has graduated from the Standard Oil Company's Sales Engineering School.

Dearborn Centerless Grinding Co. uses STANICUT Oil 126 BCS

Difficult-to-grind stainless steel was the problem at Dearborn Centerless Grinding Company. Wheel loading and wheel break-down were such that soluble type oils weren't satisfactory. For this reason, Dearborn began using STANICUT Oil 126 BCS.

Company management found it secured these six important benefits by changing to STANICUT Oil 126 BCS in grinding operation:

1. Better finishes.
2. More pieces obtained per wheel dress.
3. Superior wheel life obtained on profile jobs.
4. Harder wheels could be used.
5. Finer grit wheels could be used.
6. More stock per pass could be removed.

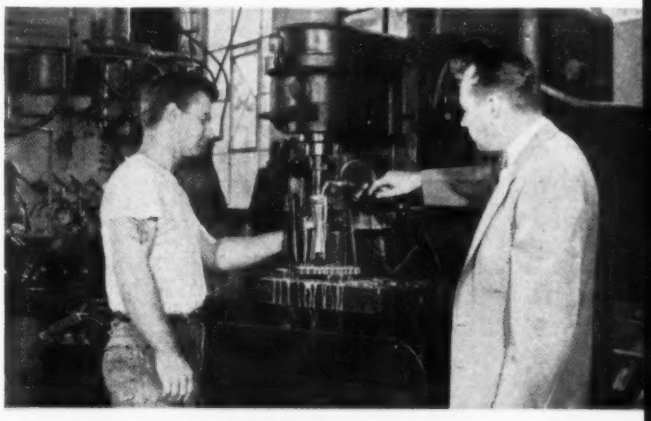
STANDARD OIL COMPANY (Indiana)

Woodford Manufacturing Company uses STANICUT Oil 155 CS

This Des Moines manufacturer was drilling and boring a steel wheel fork. Production was at the rate of 45 pieces per hour. Standard Oil lubrication specialist, Jess Nelson, called Woodford plant management's attention to the fact that STANICUT Oil 155 CS was being used successfully elsewhere in the plant. He suggested that much better production and longer tool life would be obtained if STANICUT was used in this operation.

The change, when made, increased production to 78 pieces per hour. Tool life was extended. At the same time, by using STANICUT Oil 155 CS, a 46% reduction in cutting oil costs was achieved.

STANICUT Oil 155 CS is an oil especially formulated for use in machining operations involving tough alloy steels which tend to tear and smear.



Woodford operator Elmer Light checks piece in Sundstrand Rigidmill while Standard Oil man Jess Nelson adjusts cutting oil flow. Jess, too, knows how to advise manufacturers on metalworking problems. He's had more than four years' experience doing such work. In addition, he has a degree in engineering from the University of Iowa and is a graduate of the Standard Oil Company's Sales Engineering School.

W. B. Noland, Woodford engineer, demonstrates Rollway Dock Plate to Jess Nelson. Parts machined using STANICUT Oil 155 CS are for this unit designed by Noland.

Get more data on STANICUT Cutting Oils from your Standard Oil industrial lubrication specialist. One of these men is nearby in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Find out whether this new machine will bore your parts 3 to 8 times faster!

Parts with long holes . . . or identical parts,

The new LeBlond-Carlstedt Rapid Borers solid bore, trepan or counterbore holes 3 to 8 times faster than by the conventional D-bit method! *Hole capacity from 5/16" to 4-1/4" diameter.* Basically, the Rapid Borer is suited to work that is symmetrical for balance in rotation—round, square, octagonal, tapered or stepped. A wide variety of hole diameters and depths as well as work sizes can be handled.

The Rapid Borer was developed expressly to accommodate revolutionary new tooling which cuts at very high speed with good accuracy and finish. Cutting oil at high pressure is forced between the boring bar and hole wall forming a continuous bearing. It flushes back through a hole in the boring head and bar, carrying away the chips as it goes. Chip form is controlled both by tool angles and proper feed and speed combinations; thus tool faces are kept clean and chip passage clear. Cutter design produces balanced cutting pressures thereby controlling concentricity.

This new tooling requires a machine with the following characteristics, all of which are incorporated in the LeBlond Rapid Borer design—High spindle horsepower; Ample rigidity throughout; Complete absence of vibration at all speeds; Infinitely-variable feeds, independent of speeds, while running under load; Final drive to spindle through belts; Large volume of cutting oil. Available in 3 sizes, No. 15, No. 30 and No. 60.

Tell us about the holes you'd like to produce faster. Large holes or small. If the Rapid Borer can handle the job, we'll show you how to produce them faster than ever before. Other equipment available for holes larger than 4¼".

THE R. K. LEBLOND MACHINE TOOL COMPANY
Dept. C, Cincinnati 8, Ohio

Gentlemen:
We want to know if your Rapid Borer really will bore our part 3 to 8 times faster. Here's a description of the job.

*Size of hole to be bored*_____

*Length of hole to be bored*_____

*Annual production of parts*_____

*Material and Hardness*_____

Conformation of part and dimensions (send sketch or print)

Name_____

Title_____

Company_____

Address_____

City_____ State_____

bored as one piece, then cut apart.

These tremendous production savings can be yours!

Rapid Borer Time: 5.2 minutes
D-Bit Time (old method): 41.5 minutes
Hole diameter . . . 1-17/32"
Hole length . . . 31¼"
Part material . . . C-1141 Hot Rolled 187 Brinell
Part outside diameter . . . 2.450" at small end, 2.710" at large end.
Feed rate (solid bore) . . . 6" per minute

Rapid Borer Time: 17.75 minutes
D-Bit Time (old method): 86 minutes
Hole diameter . . . 2-3/16" Core diameter . . . .852"
Hole length . . . 53¾"
Part material . . . 4140 Forging 200 Brinell
Part outside diameter . . . 3.455" at small end, 4.425" at large end.
Feed rate (trepanning) . . . 3" per minute

For complete information write for Bulletin LC 501C

THE R.K.LeBLOND MACHINE TOOL COMPANY

Cincinnati 8, Ohio

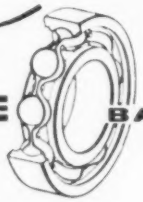
World's Largest Builder of a Complete Line of Lathes for more than 70 years

LeBLOND of Cincinnati

FACTS

about

NEW DEPARTURE BALL BEARINGS



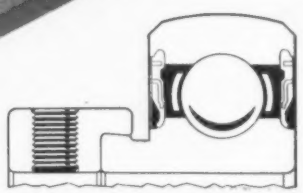
NOW A NEW DEPARTURE IN PILLOW BLOCKS

- Clean, rigid, compact design.
- Free of any lubricating fixtures.
- New Departure ball bearings sealed and lubricated-for-life.
- Pillow Blocks easily mounted without special tools.
- Only high capacity precision ball bearings used.
- Accommodates any misalignment.
- 31 shaft sizes, ½" through 2 7/16".
- Interchangeable with most makes.

Send for Catalog PBC for complete details.

GREASE SEALED IN
DIRT SEALED OUT
with
FAMOUS SENTRI-SEAL

New Departure Pillow Blocks employ the performance-proved New Departure Type AE Adapter ball bearings with spherical O.D. for alignability and steel-reinforced Sentri-Seals for long life protection against dirt or grease leakage.



The bearings are easily applied to the shafting and are positively locked in position with an eccentric cam locking collar and set screw.

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

Now—Foamed Aluminum

Cast aluminum, honeycombed with air cells, is almost as light as balsa wood. Like wood, also, it can be sawed, nailed, bolted and glued to other objects. The product was developed through Air Force-sponsored research, is said to have potential as a substitute for lumber in many applications. Added benefits: it is fireproof, rot-resistant, can be mass produced.

Warehouse Adds Service

Add to the warehouse industry's growing list of customer services: Close-tolerance finishes for steel plate. A. M. Castle's new $5 million Chicago warehouse features three Blanchard surface grinders. Customers like the idea so much it's safe to assume that the trend will grow.

More Missiles Coming

U. S. aerial defenses will be reinforced with Hawk anti-aircraft missiles. Guarded references indicate the Hawk will bring down low-flying planes, thus cover a defense area now fairly wide open. More Nike battalions and new Hawk units will come into service in the year ahead. The 90mm, 120mm and Skysweeper (75mm) gun battalions will be phased out.

France Needs New Tools

Less than 40 pct of the machine tools in France are under 10 years of age. A government committee wants to increase this figure to 45 pct by 1961. Recommended government aids to French machine tool builders include: (1) no taxes on investments made in machine tool firms; (2) authorizing amortization of equipment at more than 100 pct to offset inflationary trends; (3) granting medium term equipment credits of 10 years, with reduction of interest rates to only 4 pct.

Boost Alloy Hot-Strength

A new technique called "dispersion strengthening" is said to hold promise for toughening alloys that normally fold up at red heat. The process scatters small, hard particles a few millionths of an inch in diameter throughout the metal. Toughening effect of the powder particles is likened to that of gravel reinforcement in asphalt road material. Forecast is that the "dispersed" alloys should also be more resistant to abrasive wear at all temperatures.

Order Steel-Spar Miller

Apparent trend toward greater use of missiles doesn't mean the Air Force is giving up on planes. Researchers still aim to lick the high-heat barrier in piloted aircraft. Toward this end, a development order has been placed for a spar miller to machine wing spars out of stainless steel.

Carbon Steel For Reactors?

Low-carbon steel in high-temperature water eventually develops an effective anti-corrosion film. Suggested use of such steel in reactor coolant systems bogged down because of the high initial corrosion rate. Now, however, a deposit of "electro-less" nickel, only one microinch thick, gives indications that it will inhibit this early corrosion rate and give the steel ample time to form its own protective film.

Spring Tester Saves Time

Setup time for fatigue testing coiled springs can be greatly reduced with a new machine that simulates coil-spring stresses in a piece of straight wire. The device stresses the specimen in reversed torsion, using two aligned gripping heads that oscillate individually through an angle of about 120°. Results on straight wire show good correlation with those obtained from conventional fatigue tests on coiled material.

Auto Makers Have Steel

The recurring rumor that automotive producers are placing tonnage orders for sheet steel in the Midwest is still without foundation. Latest crop of reports about increases in July bookings adds up to nothing more than some filling of spot shortages. As previously forecast, the real action shouldn't begin until late August and September.

Apron hoist unit on ore unloader, consisting of single welded steel drum driven by electric motor flexibly-coupled to Cleveland Worm Gear Speed Reducer.

147 CLEVELANDS on 7 new unloaders help speed ore removal at Chicago docks

SEVEN new unloaders to speed up ore handling have been erected at United States Steel's South Works in Chicago. Ten-thousand to sixteen-thousand ton ore boats now enjoy turnaround rates averaging only seven to eight and one-half hours.

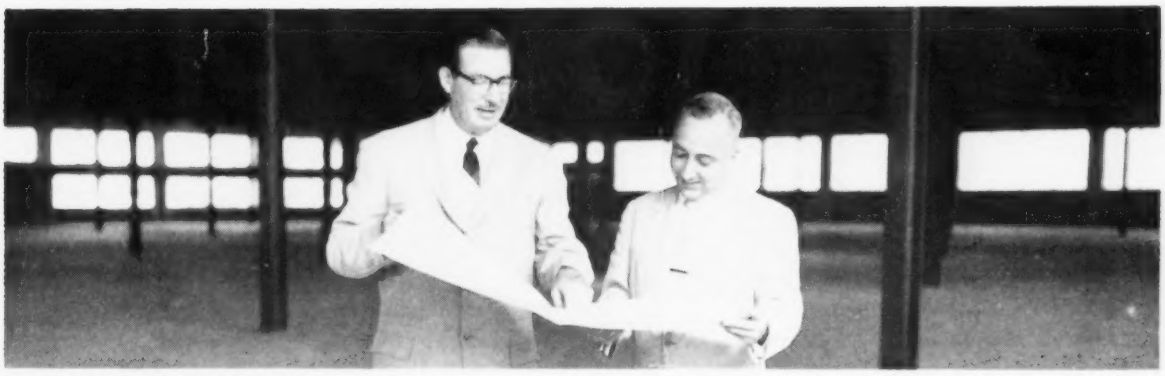
These new unloaders—three on the south dock and four on the north dock—are equipped with Cleveland Worm Gear Drives—21 speed reducers per unit, 147 in all.

Wherever equipment has to perform dependably in rugged service, day in, day out, with minimum attention, builders and users alike choose Clevelands. For 45 years, Cleveland has concentrated its engineering and manufacturing facilities on making finest quality worm gearing to meet customers' most exacting requirements.

Write for new Bulletin 145 which shows standard and special design drives offered by Cleveland. The Cleveland Worm and Gear Co., 3282 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

CLEVELAND
Worm Gear
Speed Reducers



PLANNERS AT WORK: Scranton Chamber of Commerce officials scan blueprint in new plant leased by Chrysler.

The Lackawanna Valley Comes Back

What Happened to Scranton in 12 Years

27 COMMUNITY PLANTS

Appraised Value	$19,365,000
Industrial Floor Space	2,620,236 sq ft
Employed	7,775
Potential Employment	14,950
Annual Payroll	$24,953,000
Potential Payroll	$59,800,000

43 NEW BUILDINGS

Cost of Plants	$69,234,000
Floor Space	3,583,900 sq ft
Potential Employment	10,680
Potential Payroll	$32,787,880

100 EXPANSION PROGRAMS

Cost	$18,548,400
Employment	24,700

Scranton Plan Proves Its Industry-Drawing Power

A Community Gets Behind Its Businessmen

Scranton, Pa., in the heart of the depressed anthracite belt, is making a remarkable economic comeback.

The city's investment of money, effort, and faith lures diverse industries. Unemployment rolls drop sharply.

▪ Scranton's industrial development gamble is paying off. In 12 years an investment of $4 million has financed construction of 27 new plants, now valued at $19 million, and provided employment for nearly 8000.

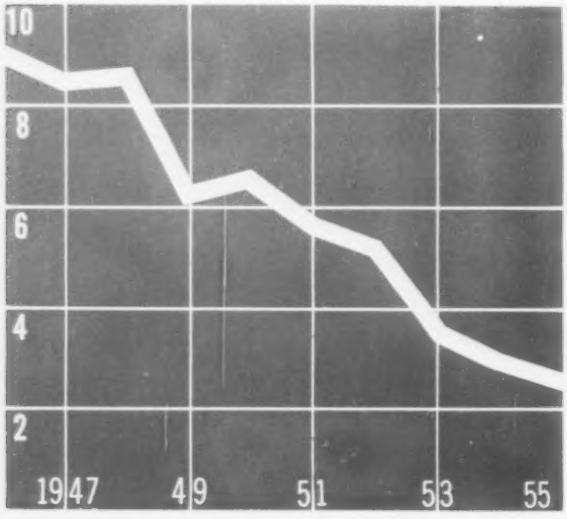
Leasing of a $1,200,000 community-built plant to Chrysler Corp. for production of Army tank parts assures the city's civic leaders that their decision to "build ahead" is sound. Of the 27 plants erected under the Scranton Plan to attract new industry, the Chrysler plant is one of the first built on speculation. That is, construction was started before a tenant was found.

Unemployment Drops—"We are

How Scranton Plan Worked Out

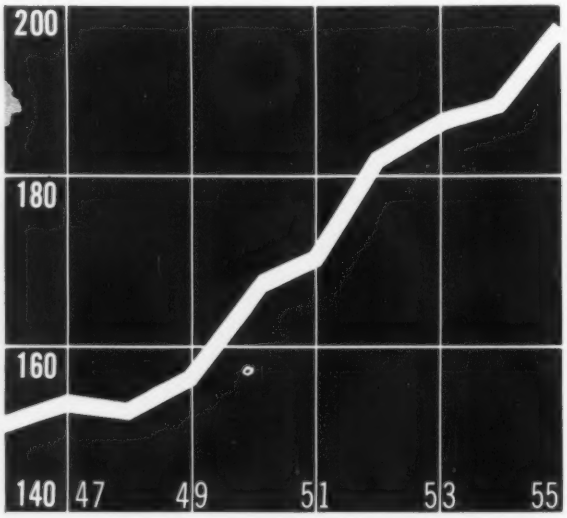
Although Area's Mainstay Faded

Anthracite Coal Production (Millions of Net Tons)



. . . The Community Prospered

Scranton Bank Deposits (Millions of Dollars)



going ahead with plans for plant No. 28," says Willis Jones, executive director of the Scranton Chamber of Commerce, which is spearheading the program.

For more than a decade, Scranton has been struggling to lift itself from an economic depression brought on by collapse of its single big industry — anthracite mining. The city is still listed as a distressed area by the U. S. Dept. of Labor. Scranton's unemployment ratio currently is 9 pct, compared to a national average of 3.9 pct. But the 7000 unemployed now is quite a contrast to 39,000 in the city's worst year—1939. Scranton's population is 125,000.

Private Capital Lured—The community effort has played a large part in stimulating privately-financed construction. Since 1945, at least 43 privately-financed buildings valued at $69 million have sprung up in the area. And existing companies have invested $18.5 million in expansions.

When hard times hit, Scranton had a double handicap. Not only was its main industry ailing, but there were no industrial buildings available. When a coal mine closes down there is nothing left in the way of vacant factories for another industry to use.

Townfolk Pitch In—The Scranton Plan got the money to finance its first construction from contributions by businessmen, housewives, institutions, labor organizations. Many who were fortunate enough to have jobs pledged one pct of their annual pay to the fund. Local banks and insurance companies subscribed to first mortgage bonds.

Recent legislation by the Pennsylvania Industrial Development Authority allows second mortgages to be placed with the state up to 30 pct of a plant's cost. Scranton Plan officials see this move as easing their financing problems.

"Our goal," says Mr. Jones, "is total employment. It may take five or 10 years more, but we are confident now we can reach that goal."

The Setup—Here's how the plan works:

Four corporations handle planning, development, financing, and building of the plants. They include Scranton Industrial Development Co.; The Scranton Plan Corp.; Lackawanna Industrial Fund Enterprises, Inc.; and Scranton-Lackawanna Industrial Building Co. All are listed as non-profit organizations.

Money obtained from sale or rental of existing buildings is used to finance new construction. To a prospective tenant, a plant may be acquired on a lease, lease-amortization, or outright purchase basis.

Option to Buy—Total cost for a completed plant, including land, lighting, power wiring, and sprinkler system is about $6 per sq ft.

Under the lease-amortization plan, the plant can be financed at no capital outlay by the tenant. Part of the monthly rental is set-aside as the tenant's equity. The balance is used to pay insurance, upkeep, and taxes on the building during the term of the lease.

At any time the tenant decides to buy, his equity can be applied against the unpaid balance. Of the 27 existing plants, nine have been bought by the tenants.

Many Small Firms — Approximate cost to a lessee in a 15-year period is from 57¢ to 60¢ per sq ft. On a 20-year lease, the cost is from 50¢ to 53¢ per sq ft for the first 10 years, and 30¢ for the balance of the lease.

While Scranton could claim only a handful of companies other than anthracite operators in 1945, its diversified list of industries now is impressive. Most are small or medium-size firms. The area has only seven companies employing more than 1000. And two of these are coal mines.

Metalworking Is Second — The largest industrial group to accept Scranton's invitation is apparel manufacturing. The Chamber of Commerce lists 110 of these firms. Second is metalworking, with 27. Others are food processing, 25; weaving and throwing, 21; mine operations, 15; graphic arts and transportation, 10 each.

The Chamber of Commerce is seeking to attract industries that employ large numbers of semi-skilled and skilled men.

Chrysler's Impact—"It is much easier for a woman to get a job here than it is for a man," Mr. Jones points out. "Thirty-nine pct of the women in town are working, compared to a national average of about 12 pct." The high average is due, of course, to economic necessity plus the large number of textile companies in the area.

The coming of Chrysler will mean jobs for at least 500 men. And the plant is expected to attract subcontractors into the area. Retail businessmen expect a corresponding surge in sales, as do utility and transportation services. But most important, it means Scranton's unique community industrial development plan is one step nearer its goal—total employment.

The Selling Points—Scranton is proud of its new plants in other ways. They recently were given an architectural award for up-to-date, functional, one-story design and for speed of construction. They are readily expandable.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

TV Set Tracks Die Layout Machine

Operator of a huge, new Alcoa machine gets an assist from three cameras.

He can check vernier scales at different locations by merely switching channels.

▪ A new die-layout machine operating at Aluminum Company of America's Cleveland works uses television to check dimensions of huge die blocks.

A 17-in. TV screen at the control panel flashes pictures beamed by three cameras trained on finely calibrated vernier scales. With this assist, the operator can check to a thousandth of an inch the machine's position as it locates dimension points on the hardened steel die block.

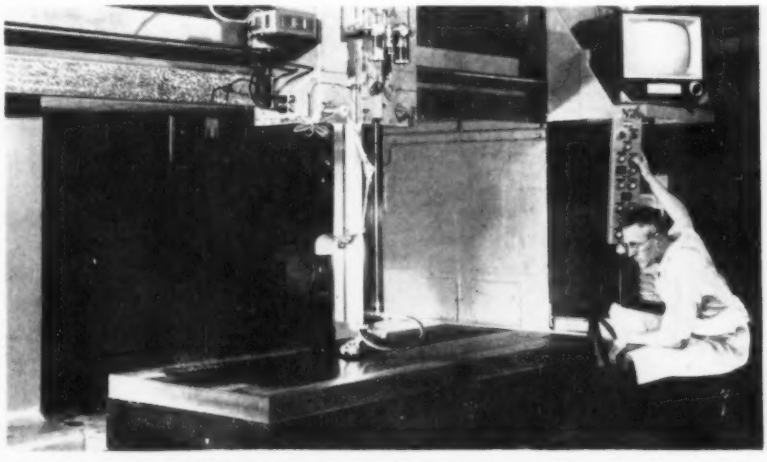
Three-Way Check — Alcoa says the new machine enables it to produce at close tolerances dies so large they were considered impossible a decade ago. The machine was developed by Alcoa and Consolidated Machine Tool Div. of Farrel-Birmingham, Inc. It can move in three directions as it lays out the die's dimensions.

The cameras constantly track the position of the machine's scriber as it inches across the surface of die blocks up to 10 ft in width, 22 ft in length, and more than 3 ft in thickness.

Magnifies Image—Selecting each of three channels in turn, the operator quickly spots the longitudinal, vertical, and transverse position of the scriber. The vernier images are magnified to 10 times actual size. Checking frequently, he lays out with push-botton precision lines that later guide a cutting tool during the actual die sinking.

This newest step in the art of die layout was brought about by the need for bigger dies in the Air Force program. The machine eliminates a painstaking and cumbersome manual layout operation.

As die size constantly increased, the usual layout tools had to be enlarged to a point where they were too awkward to handle.



AUTOMATIC LAYOUT MAN: A 50-ton die block is set in place, ready to be scribed by Alcoa's new die layout machine. Operator checks dimensions on three verniers by switching channels on television set, upper right.

FOIL MILL: New four-high, 62 in. mill made by Blaw-Knox Co., Pittsburgh, will roll aluminum foil from .102 to .00035 in. at speeds to 2000 ft per minute. It is at Cochran Foil Co., Louisville, Ky.

Aluminum Foil Raises Its Sights

Foil makers will sell 119 million lbs this year, but see 300 million lb market by 1960.

Mills have high hopes for several new applications

Makers of foil rolling mills are doing a land-office business in faster, bigger models.

▪ Like most other aluminum products, the market for aluminum foil is static or easing at the moment. But producers are investing heavily in a growing market with a strong future.

First quarter shipments of 47.4 million lb were off from 51 million lb in the same period last year. Producers have been hit by a general reduction in user inventories. There has been a leveling off in the packaging market, which takes about half of total output. Several budding applications, such as home insulation, have been retarded by the slump in home building.

Big Kitchen Market—Bright spot in the picture, household wrap, is running 10 to 15 pct ahead of last year, and containers for pre-cooked foods are finding more uses; will probably enable producers to finish the year at about the same level as 1956, with 119 million lb shipped.

"There is every reason to believe the market for foil will double again in the next five years," says John Hamilton, manager of foil sales at Alcoa. Consensus of producer opinion is that output will hit 300 million lb per year by 1960.

Producers' Plans—Alcoa is putting $27 million into foil mills in a program that began in 1955, when the company started operating four new mills at Edgewater, N. J. It ordered 11 more later that year, and three in 1956. Since 1955, Alcoa has doubled its foil capacity.

Reynolds Metals, the first to get its teeth into the consumer market, is building a new $3.5 million plant at Richmond, Va., for making both flexible and rigid foil-to-cardboard laminated cartons.

New 7-color high speed printing presses will handle stock up to 44 in. wide. Reynolds will probably go after the flip-top cigarette box market from this new facility, scheduled to open late this fall.

Mill Makers Boom—Blaw-Knox Co., has sold over 115 foil mills, 34 of them since 1950. Last year United Engineering and Foundry built 13 foil mills, capable of rolling down to .00025 in. In addition, United built cold reduction mills for foil breakdown.

The trend in foil production is toward bigger, faster mills. Until the end of World War II foil was rolled on two-high mills with 44 in. rolls, and speeds of 300-600 fpm. In 1948 Reynolds installed five 4-high mills with speeds over 2000 fpm.

Kaiser is now rolling 56-in. foil at speeds to 3000 fpm, on two mills at Ravenswood, W. Va. And by early 1958 it expects to be able to handle widths to 66 in., at 4500 fpm, on two new mills. Alcoa has three new 72-in. mills at Alcoa, Tenn.

The average mill now has five stands and reduces stock from .026 to .00025 in. About half the foil is rolled to .0035 in.

New Markets—Among new applications for which producers have the highest hopes are home insulating foil; and foil to be used in coils of transformers, motors, and other electrical equipment. The packaging and container market is due for continued growth, producers say. And on the verge of commercial production are foil-lined, multiwall bags, and laminated rigid containers.

But no matter how good business gets there will be several problems which will still need solving. Foil makers straddle industrial and consumer markets. Prices do not follow the regular pattern because they must be kept sharply in line with competition, especially in consumer products. Some types of foil went up, with the general aluminum price increase last November, while others are unchanged since 1955.

Consumers Get Service — Gearing production to buyers' markets is difficult. Customers, for the most part, operate on short inventories, so producers offer deliveries down to 10 days. Since a normal production cycle is two to three weeks, mills must carry an in-process inventory.

And producers say it is difficult to peg direction of sales. A large part of their output is aimed at consumer markets. Orders traditionally come in batches. One day a mill will be drumming up business, and the next be jammed.

LL.D. For Carroll

Wallace Carroll, director of the Metalworking Equipment Div., Business and Defense Services Administration of the Commerce Dept., is now a Doctor of Laws. The honorary degree was conferred by Boston College, where Doctor Carroll earned his Ph.B. in 1928.

The MED head will return to his post as president of the American Gage and Machine Co., Chicago, in August. He is the last industry man to hold the top post in Metalworking Equipment Division. Future directors will be government men.

A New Way To Cut Sulfur Content

Quick and easy method developed at Battelle for Diamond Alkali Co.

Process can be adapted to continuous or batch operations in mill or foundry. — By H. W. McQuaid.*

▪ A relatively simple and fast method of reducing sulfur and silicon in hot metal or steel has been developed at Battelle Memorial Institute. The project was sponsored by Diamond Alkali Co.

Caustic soda and other sodium compounds are used to eliminate sulfur from liquid iron or steel without harming refractories or creating dangerous fume conditions. Silicon content may be reduced by adding oxygen. Carbon and phosphorous can also be removed.

It's Flexible—The process can be adapted to continuous or batch operations in a steel plant or foundry. Sulfur and silicon can be removed simultaneously, generally in a matter of seconds. In test runs at Battelle, sulfur content has been reduced from 0.100 pct to below 0.020 pct in less than a few minutes. The reduction of sulfur to well below 0.010 pct is possible. Under certain conditions, the sulfur is reduced to less than 0.002 pct using caustic soda.

The Diamond reactor is essentially a cylinder, open on both ends. Hot metal is poured in at one end of the inside surface. Heat is provided by a gas burner at the other end. The cylinder provides a large area of contact between the metal and the chemical reagent. The centrifugal action separates gases, slag, and metal in layers. The heavier metal protects the refractory surface completely, and the gases are eliminated into the exhaust system.

Why Metal Moves—Movement of the liquid metal from one end to the other is made possible by a low refractory shoulder on the inlet end of the cylinder. As it flows over the shoulder, the metal builds up a "head" which moves it toward the exit. The result is a relatively thin layer of metal covering the inside surface which moves constantly toward the outlet end where it is collected.

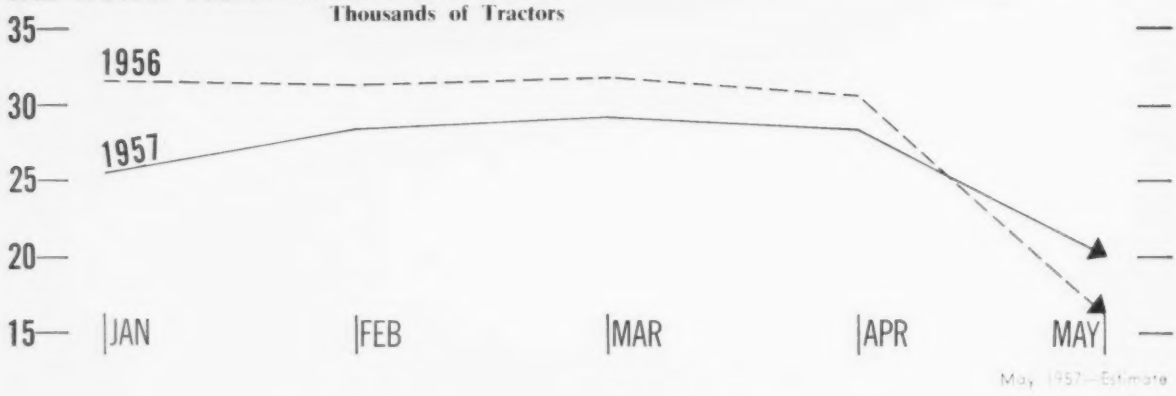
The rate of axial travel is dependent in part on the "head" built up in the bath at the inlet end. This, in turn, depends on the rate at which the molten metal is poured into the reactor. In other words, the metal will be carried through the reactor as fast as it is introduced.

The Advantages—Here are some of the important advantages of the Diamond reactor:

1. Very large area of contact between liquid iron or steel and the chemical reagent.
2. Constant mixing under pressure of the reacting materials at point of contact.
3. Heat available to produce whatever temperature or reaction rate is desired.
4. Simultaneous separation according to specific gravities of liquids and gases with a separation of metal and slag formed by the reaction and control of the gaseous reaction products.
5. Continuous or intermittent (batch) operation.
6. Can be operated in parallel or in series with present equipment without interference or loss in production time.
7. Very high production rate.
8. Low investment cost; low operating cost.

* Metallurgical Consultant.

Will Tractor Production Overtake 1956?



Farmer May Be Headed for Town

Don't get too excited about the farm implement market. But there are signs of better-than-last-year sales of some products.

Inventory cutbacks are just about over. Production is scaled close to sales. — By K. W. Bennett.

■ The farmer is beginning to buy. He's three weeks behind the traditional buying season, but the signs are as welcome as spring rains.

The first indication is in tractor sales, historic implement market barometer. January production was only 78 pct of a year ago, but the 1957 monthly figures continue to creep up on 1956.

Although May production figures will confirm the usual seasonal drop, sales exceeded a year ago.

Supplier Outlook — A growing segment of forecasters bet farm implement sales will exceed 1956 by 12 pct, totaling $1,115,000,000. However, since prices will increase, dollar volume will not represent an equivalent boost in unit production.

Suppliers to the industry will see no quick change. Inventory reductions, coming from last July, are rigid. Manufacturers will continue trimming inventories close to sales through July. First strong resurgence in buying will not come until late August.

A sales vice president told THE IRON AGE: "Things broke loose 10 days ago. Normally we peak out in April in our manufacturing activities. Now, we're getting a heavy buying wave in combines, mowers, cultivators, balers and rakes. Our dealer stocks are at the lowest point in two years."

A plant operations chief reports a strong surge in harvesting combines. He says the company is oversold, with an inventory shortage.

Not All Agree—More cautious heads fight optimism. One major producer hints at a 10 pct increase, but another has decided 1957 will about break even with 1956.

Another factor is inventory. Manufacturers overproduced early in 1956. But this spring inventories and excess dealer stocks are down.

One manufacturer is actually worried about repair parts stocks, his inventories have fallen so low. Spare parts, estimated at as much as 18 pct of the billion dollar industry, are an important part of his income. Now he doesn't have enough in stock.

Will the sales pickup fade out? The farmer does have money. The corn-to-hog price ratio is at its best level since 1954. The farmer boosted his cash receipts by $733 million in 1956, his bank account by two pct. Farm new building expenditures were cut about $100 million from the $1.6 billion spent in 1955.

Standing ready to serve you!

Your local steel distributor plays a vital role in your production picture. He supplies that all-important material—steel—in any amount, size, or shape, from his well-stocked warehouse. And he delivers immediately upon demand!

Whether you need a small quantity of steel to wind up a job without going back to the mill—or a medium-size quantity to supp'ement your present supply—your distributor is capable and instantly ready to fill any need. He's truly "at home" with your problem, regardless of its size.

Your local warehouse distributor is indeed the strongest link between the mill and you—an indispensable supply source. And he's never any farther away than your telephone.

Call him for any quantity of Weirkote zinc-coated sheets—Weirzin electrolytic zinc-coated sheets—or hot or cold rolled sheets. You'll be surprised at the scope of the services he offers you . . . courteously and punctually.

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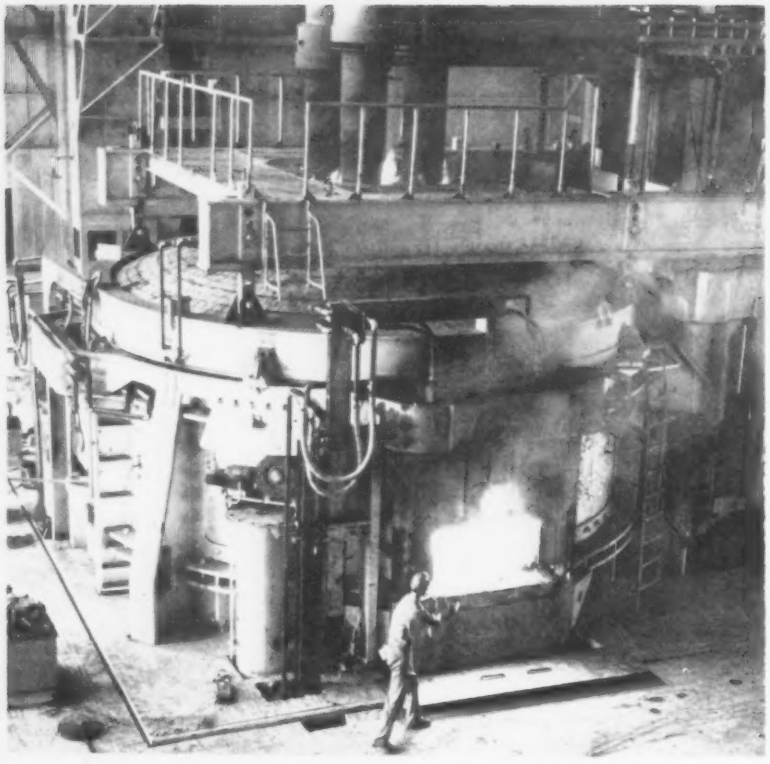


CHARGING: New electric furnace at Republic Steel's Gadsden, Ala., plant is the first of two expected to up capacity more than 50 pct, to 1,197,000 tons. The second will be installed later in the year.

DuPont Ruling Hits B-Y Merger

▪ The Justice Dept. may have gotten an assist in its struggle to block the Bethlehem-Youngstown merger from the U. S. Supreme Court's recent ruling that the ties between DuPont and General Motors must be severed.

Principal point in the high court's ruling is that DuPont violated the Clayton Antitrust Act in holding 23 pct (worth $2.7 billion) of GM stock because it promoted a possible preferential position as a GM supplier. But the point government attorneys believe will strengthen their hand in the Bethlehem-Youngstown case is the Supreme Court's upholding of Section 7 of the Clayton Act. It forbids any merger, combination, or acquisition which would bring a "probable lessening of competition or tendency to monopoly."

Block and Tackle—The ruling makes it easier for the government to block mergers without any proving of monopoly, and permits the government to tackle a case regardless of when the actual merger took place. DuPont bought GM stock almost 40 years ago.

While the trust-busting power of the Justice Dept. and the Federal Trade Commission has been strengthened by the DuPont ruling, there probably won't be any immediate rash of new antitrust cases. But it will cause company managements to think twice before consummating a merger.

Notification Sure Thing—Effect of the Supreme Court's ruling on the pre-merger notification bill now pending in Congress won't be significant. The bill is being brought along slowly. It's a toss-up whether it will pass this year or not—but it's pretty certain to pass eventually.

If anything, the court's decision may reduce pressure for quick passage this year, and permit it to be held over. Opposition to the measure, mostly among the larger firms, is not too strong when measured against support of both political parties and the Eisenhower Administration.

The problem, the measure's backers agree, is getting all the legal bugs out of the bill. Simplified, it would require firms planning to merge to notify the government 60 days in advance if their combined assets were valued at more than $10 million.

ASTM Officers

Richard T. Kropf, vice president and director of research, Belding-Heminway, Inc., New York, was elected president of the American Society for Testing Materials.

Elected vice president was F. L. LaQue, vice president and manager, Development and Research Div., International Nickel Co.

Directors are C. L. Clark, Steel and Tube Div., Timken Roller Bearing Co.; A. E. Jube, B. F. Goodrich Co.; J. H. Koenig, director, School of Ceramics, Rutgers University; R. F. Peterson, Westinghouse Electric Corp. Research Laboratories; and R. W. Seniff, Baltimore & Ohio Railroad.

Attendance at the 60th annual meeting in Atlantic City last week was over 3000. Thirty-two technical sessions and 46 committee meetings were held.

3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

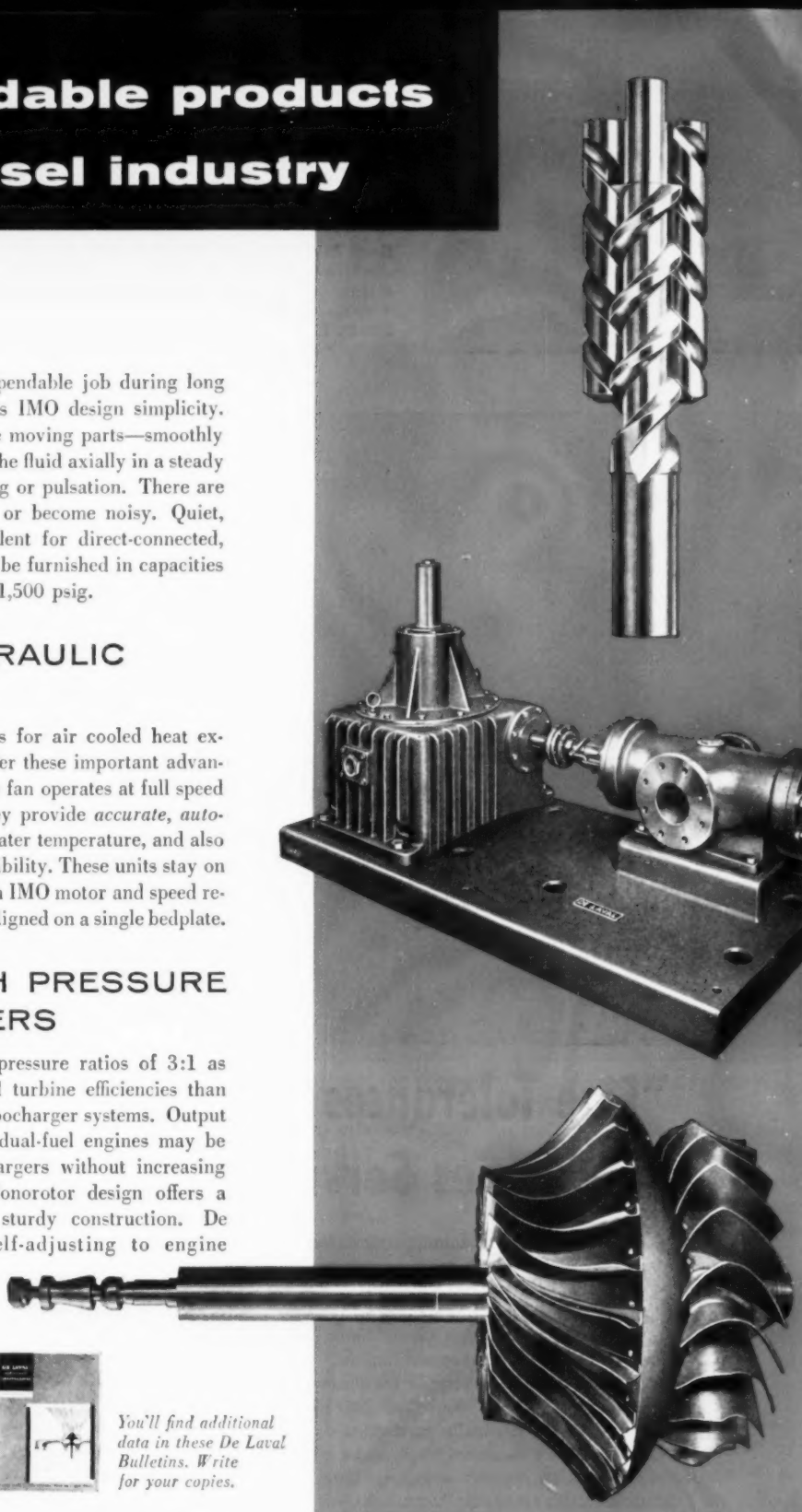
DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.



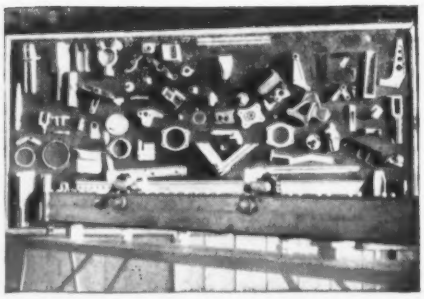
DE LAVAL

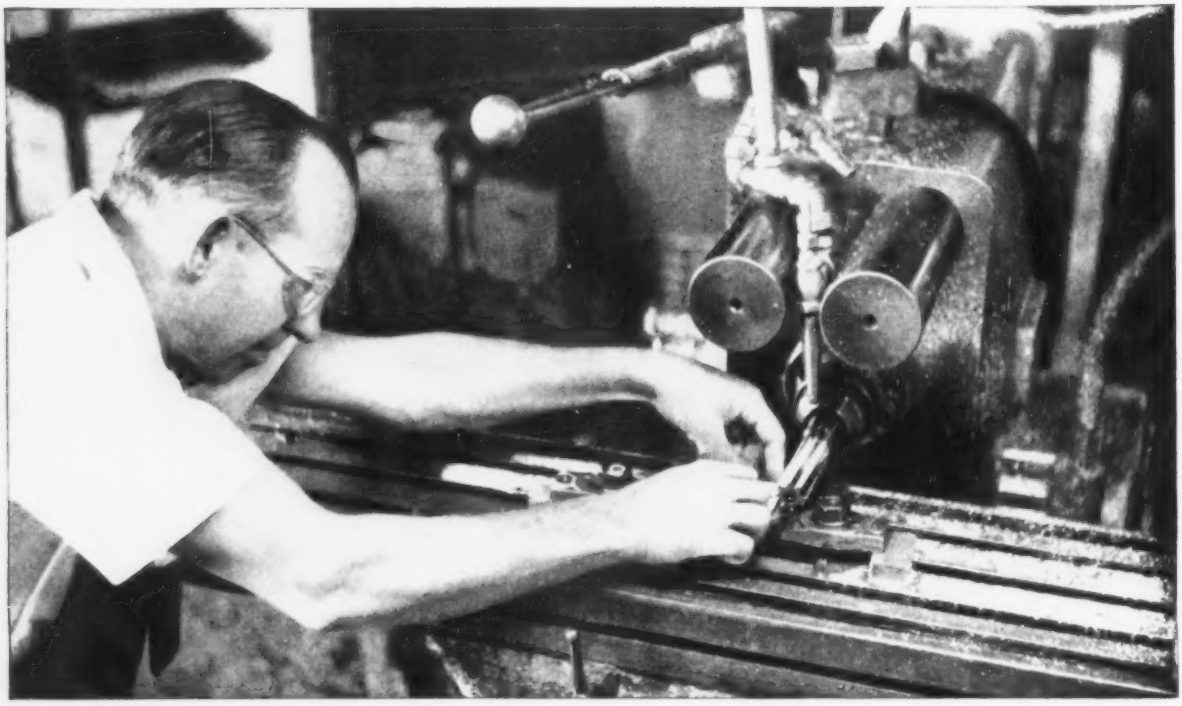
Steam Turbine Company

TRENTON 2, NEW JERSEY

◀ **Aerocycle,** a one-man helicopter now being tested by the U. S. Army, is one of the many aircraft for which Aeroaffiliates machines precision parts.

Some Examples of Aeroaffiliates' Work. All require fine tolerances and excellent finish. All were made with the help of Cities Service Chillo Cutting Oils. ▶





"Fine Tolerances! Excellent Tool Life! With Cities Service Chillo Cutting Oil"

In probably no other machining operation are the tolerances so fine, the requirements so demanding as in aircraft work . . . especially when it's for the U. S. Army or Air Force.

But it is on such work that Aeroaffiliates, Inc. of Fort Worth, Texas, has become famous.

Every day, Aeroaffiliates employees must work with tolerances as fine as .0001, and their products must have an unusually good finish . . . so good that they are measured by a special gauge before the aircraft industry will accept them.

Obviously, this could play havoc with tool life . . . "but thanks to Cities Service Chillo Cutting Oils, tool life and finish are the best ever," says Aeroaffiliates. "These cutting oils are equalled only by the help we receive from the Cities Service Lubrication Engineer, a man whose knowledge and help we greatly value."

Whatever *your* type of machining operation, there's a Cities Service cutting oil tailored precisely for it . . . and a Cities Service Lubrication Engineer to help you choose it. Call him in this week. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Colin I. Bradford

He Puts the Spark in Titanium

This prophet of one of the newest metals stumps the nation extolling its virtues.

He is out to show industry that titanium is not just an aircraft specialty.

As the price goes down, he says, more industrial uses are bound to follow.

C. I. Bradford: Civilian uses for titanium will soon exceed the military.

▪ In 1947, when Remington Arms Co. chose one of its engineers to take charge of developing a relatively unknown metal, it had picked a winning combination — Colin I. Bradford and titanium.

The phenomenal growth of the titanium industry must be credited to a handful of pioneers, one of whom is Mr. Bradford, who saw a great future for the new metal when many authorities scoffed.

Now that the lion's share of basic missionary work is completed, Mr. Bradford is tackling the job of broadening titanium's industrial applications. He feels his industry has to overcome the still widely-held belief that titanium is exclusively an aircraft metal.

Sees Many Uses—In 1950, when Remington Arms and Crucible Steel Co. of America founded Rem-Cru Titanium, Inc., C. I. Bradford was appointed director of operations. He was named president and general manager in 1954. Under his leadership, the Midland, Pa., company has grown from the pilot plant stage to one of the nation's leading producers of the lightweight metal.

He predicts civilian use will greatly outweigh military, particularly as the price of titanium continues to drop. Pointing this up, he says, is the fact that Rem-Cru's commercial (non-defense) sales during the first quarter of 1957 were seven times those of the corresponding period in 1956.

Promotes His Industry — Although an engineer (he holds a master's degree from Ohio State University), Mr. Bradford is one of titanium's best salesmen. Wherever he goes, he speaks with the conviction of a man who believes in his product. To keep up with a growth industry, he suggests, you must get first-hand knowledge. The quest keeps him traveling to industrial centers throughout the country. He also serves on the Titanium Industry Advisory Committee in Washington, D. C.

An exacting and seemingly tireless leader, he works with quiet determination. For all the promotional work he has done for the titanium industry, C. I. Bradford can hardly be called the "salesman type." Yet in his quiet way he has been getting results. "Push titanium and its applications," he tells his staff, "and we'll get our share of business."

If anyone ever markets titanium golf clubs, Brad will probably be one of the first to use them. Golf is his number one hobby. An ardent sailor, he has been beached since joining Rem-Cru in high and dry western Pennsylvania, where yachting gives way to dry land sports.

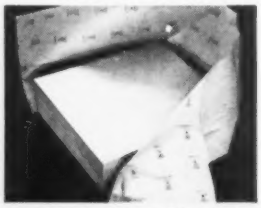
how to rustproof cold rolled steel in shipment and storage

Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong, yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.

How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

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For over 38 years—
"Paper Engineers" for Steel

Don't Bet on a Summer Slump

Seasonal trends are still there in some industries, but the yearly pattern is changing.

You can count on brisk business for most of the traditional vacation weeks ahead.

■ In the past several years, many businessmen have expressed mild surprise over the failure of the traditional summer slump to develop.

Instead, many a weary executive found business so brisk in July and August that he had to cancel his vacation plans. He sweltered in the hot office or plant taking care of unexpectedly strong orders, with only the consolation of better than expected business.

Some Seasonal Factors — What has caused this changing cycle of business? The auto industry still slows down in summer, closing out old model runs and shutting down for changeovers. The farmer's buying period in advance of the planting and harvesting is relatively unchanged. But now other forces compensate for these seasonal factors.

One thing is the emphasis on construction and capital goods spending that has been the dominant force in the economy in the past few years. This shows no seasonal slump in summer. In fact, increased activity in the warm months here has compensated for slack elsewhere.

Government Spending—Another is the tremendous importance of Federal spending, particularly for defense. There is no seasonal factor here. The continued high rate of spending has been very significant in keeping the gross national product on a steady rise and in maintaining the index of industrial production at a high level through the summer months.

There will be some decline in consumer durables this summer. Seasonal buying patterns here dictate production schedules with the peaks in winter months and somewhat lower levels in the summer.

It's in the hot weather months when consumer spending on nondurables and services is at its peak, with the spending for durables somewhat tapering off. Vacation schedules will have a slight toll in production too, which will lead to some summer market softening that is artificial, rather than indicating a significant easing in demand.

. . . How Business Looks to PA's

Survey Results — This healthy summer outlook for business is reflected in the latest monthly business survey of the National Association of Purchasing Agents.

While the purchasing agents report some easing (to them it's probably a welcome relief) in the pressures of an expanding boom time, "new orders, production and profits are satisfactory."

Upturn in June—The fact that 30 pct report better production in June than in April indicates a phenomenon that has surprised many businesses and industries—a definite upturn in orders in June that stopped or halted, even if only temporarily, an apparent downtrend in business.

This may indicate that business in general had a too pessimistic outlook on the summer months, overestimated the downtrend.

Cautious on Inventory—Another factor behind some of the so-called easing in business has been inventory control. The survey of PA's confirms this. They are continuing their drive to reduce inventories, with practically no instances of trying to hedge against anticipated price increases.

They report definite seasonal influences on employment in those industries where seasonal factors are inescapable. But overall employment in the plants of the questioned purchasers indicates a slight improvement.

In regard to buying policies, the survey indicates "buyers continue the cautious reserve in making forward commitments . . . no enthusiasm for lead times in excess of 90 days."

Prices Hold—On the price front, little overall change in the commodity price situation is noted during the past month. This could be surprising in the face of the wave of inflationary talk that is sweeping the business world.

They report that competition has continued to restrain increases, in spite of higher costs. Of significance in the price picture are the weaknesses apparent in nonferrous metals, particularly lead, zinc, and copper.

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Typical of this success is the saving in abrasive cost experienced in a large, automotive gray iron foundry. By switching to Wheelabrator Steel Shot a 17.3c reduction on every ton of castings cleaned was effected. On the 309 tons of gray iron castings cleaned daily, this amounts to a daily saving of $53.46. Figuring 250 working days per year makes annual savings of $13,365, a 15.5% reduction in abrasive costs.

The resistance to breakdown, which is responsible for these savings with Wheelabrator Steel Shot, also results in a better product finish. As the cleaning room foreman points out, "Wheelabrator Steel Shot stays round longer instead of breaking down into fines. Because of this we get a better finish in a shorter period of time."

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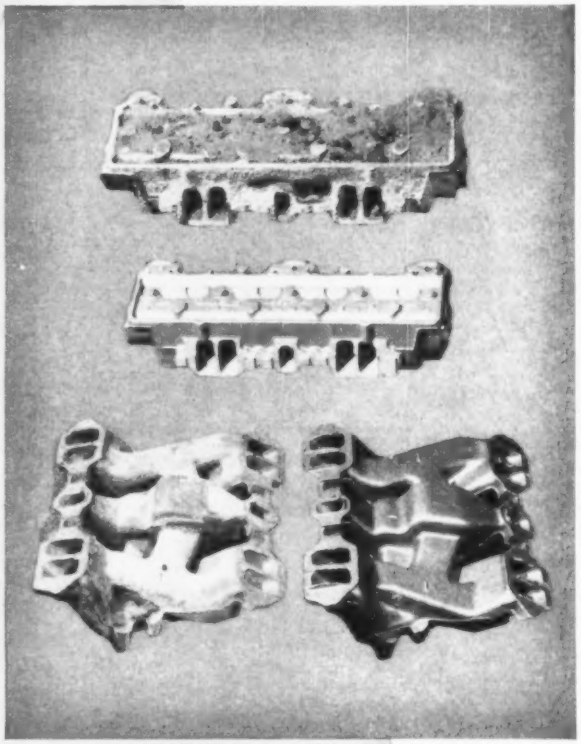

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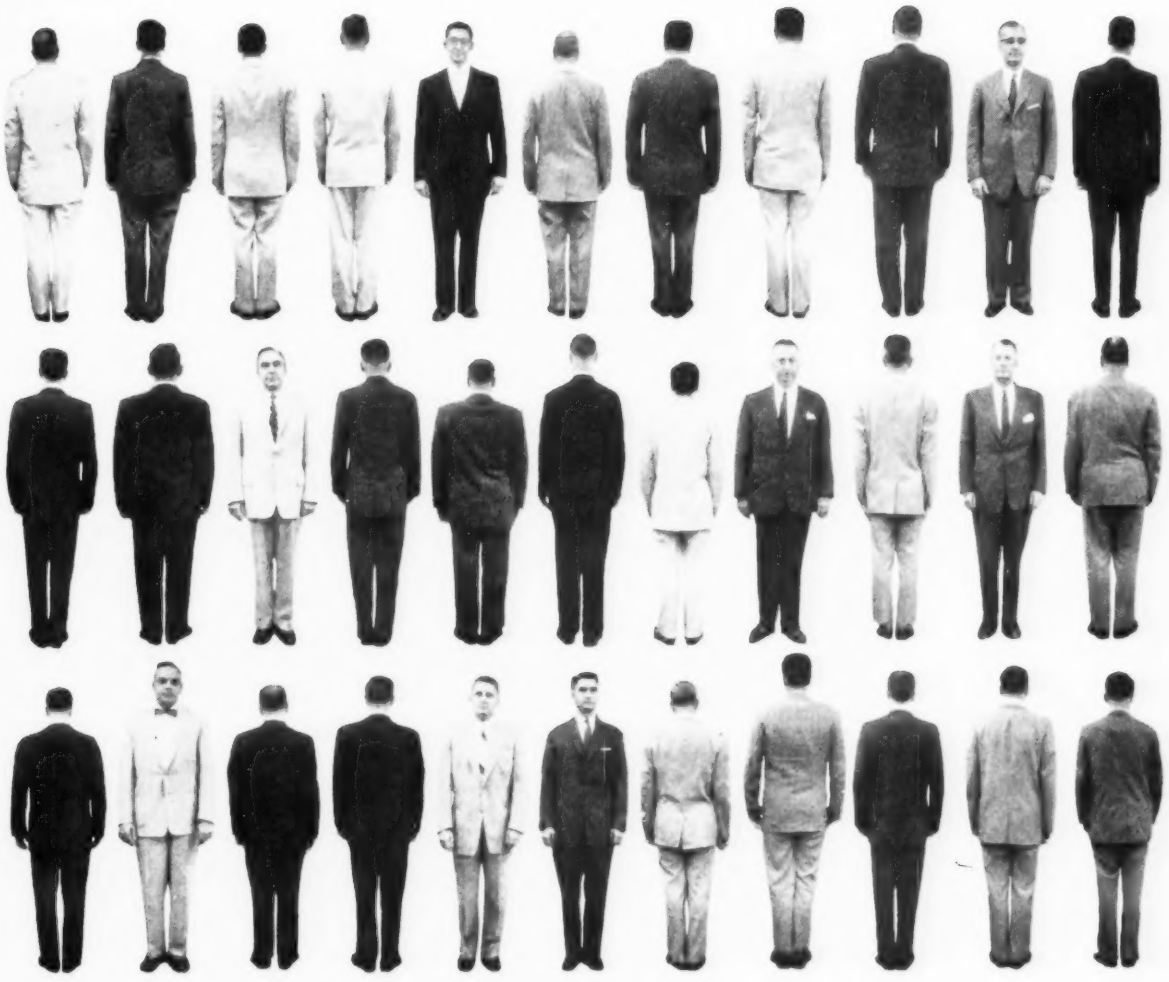


How To Pick Executives

Many companies today are running into a shortage of good managers. And the situation is not likely to change soon. If anything the shortage will get tighter.

As a result more attention is being paid to the matter of choosing the right men for executive jobs. But what makes a good manager? And how can firms improve their percentage of right choices?

To try to find some of the answers the National Industrial Conference Board undertook a two-year study of executive selection. Some broad conclusions are reported in this article.

Here you'll find what company presidents think of present methods of choosing executives and what some firms are doing to improve their supply of future managers.

Presidents Report on Executive

Few company presidents are satisfied with present methods of choosing managers.

They see the need for more planning but not many have taken a systematic approach.

Most place merit at the top of the list in choosing new executives.

▪ Finding good executives ranks high on the list of major problems facing many companies today. And if it doesn't top them all now, it stands a good chance of making it in the next few years.

"The most important act of my entire business career," says one company president, "will be the selection of my successor."

The remark points up the seriousness of the situation. It's no secret that many firms have trouble filling top executive vacancies. If they didn't, executive recruiters wouldn't be in business.

More Than Replacement — But simple replacement is only part of the problem. The executive work load gets heavier all the time. And business is moving at so fast a pace that a replacement can't be just as good as the man before him. He's got to be better.

Added to this is the need for even more executives. The creation of new management positions and the demands of new businesses will keep the executive market tight for years to come.

Where will this management talent come from? And what can firms do to boost their batting average in picking good executives? To try to find some of the answers, The National Industrial Conference Board took on a two-year study of the subject. Its recently-completed report is based on thorough research and the first-hand experiences of many top companies in the country.

One thing the Conference Board quickly points out is the big difference between executive selection and development. Development deals mostly with the training of those already earmarked for advancement. Selection is mainly concerned with earmarking the right individuals before training starts.

Survey Presidents—While much has been written about executive development, the Conference Board found that little has been said about selection. It would seem that companies are so busy training their present managers, that they pay far less attention to the matter of choosing the best employees to be trained. In effect, much of the present practice puts the cart before the horse.

To set the record straight, the Conference Board went right to the top. Since company presidents play a large part in molding a firm's future, the Board wanted to know what they think and how they act in picking executives.

Surveys were made of chief executives in large and small companies across the country. The type of businesses they represent ranges across the board—from manufacturing and retailing to wholesaling and public utilities. All in all, sixty-two top company presidents responded to this depth survey. To obtain the most helpful information, only those companies known to have good management programs were queried.

Few Are Satisfied—As might be expected, presidents have varying views on how to pick executives. Their personal backgrounds, the needs of their industry and their particular company can't help but bring forth a wide range of opinions and attitudes.

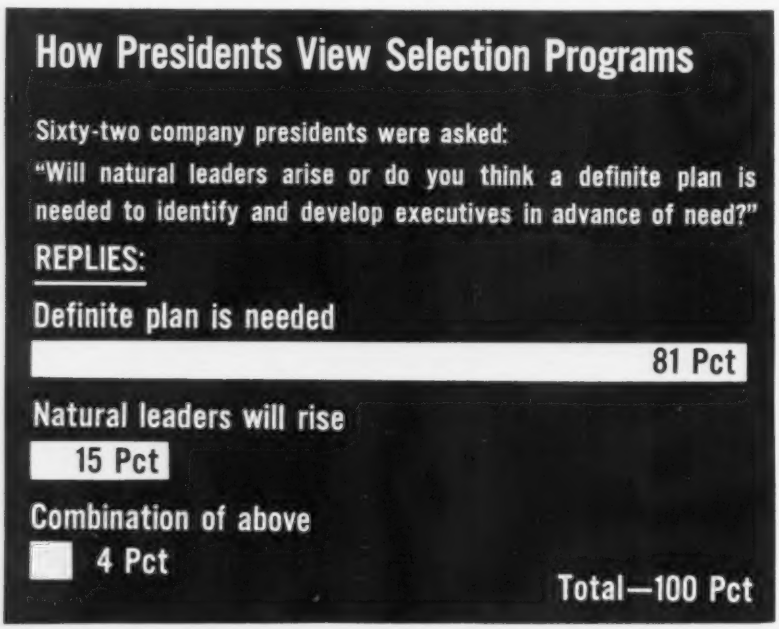
But from their detailed answers to the survey, certain major points do stand out. One healthy sign is that very few of them are satisfied with present methods of choosing managers in their own companies. "We've only made a start in this matter of selecting executives. We wish we knew more," is typical of many responses.

Most are in agreement, however, that some definite plan is needed to pick tomorrow's managers. Four out of five report being in favor of

How Presidents View Selection Programs

Sixty-two company presidents were asked:
"Will natural leaders arise or do you think a definite plan is needed to identify and develop executives in advance of need?"

REPLIES:



Selection

some plan rather than letting nature take its course.

Opposing Views — But of these very few claim their firms have adopted a systematic approach to executive selection. They recognize the problem but are not yet sure of the best way to tackle it.

On the other side of the coin, some presidents are still in favor of letting "natural leaders" come to the top.

"I believe that it is impossible to know whether a man can be a manager or executive without actual experience and tryout in the job," says the president of a small midwest manufacturing firm. "However, I believe that leadership characteristics are discernible at the college level and immediately thereafter."

Or as another president put it, "To have a good horse, choose a good colt."

Alternate Plans—Between these views are the comments of those who straddled the question. "A plan is needed that will implement the selection of natural leaders," says one company head. Another reports, "Natural leaders will rise for the top jobs. A definite plan is needed to provide middle-management personnel. The top executives will come from this latter group."

To firms with a systematic program underway, the viewpoint of those favoring the natural selection of executives is somewhat disconcerting. But there are several reasons advanced for it.

For one thing, the serious shortage of good managers has been with us a relatively short time. It did not really begin until after World War II. And it still hasn't caught up with many companies.

Pressing Problems—Another reason is that planning is something that can always be put off. Other duties of company presidents and executives can't. There will always

How Executive Jobs Are Filled

Sixty-two company presidents were asked:

"By what methods, according to your observations, are executive vacancies filled in most companies today?"

METHOD

Merit (promoted from within on basis of performance)

55 Pct

Automatic (able men naturally came to top)

15 Pct

Pirating (man hired from other companies)

10 Pct

Consultants

10 Pct

Compromise (least unlikely candidate chosen)

5 Pct

Miscellaneous (nepotism, seniority, politics, etc.)

5 Pct

Total — 100 Pct

Report on Actual Executive Selection

Presidents were asked to tell how the last three executive positions were filled in their own companies. Information was supplied on about 200 appointments.

Positions include: chairmen (2); president (12); vice president (56); department heads (68); lower executive levels.

METHOD

All three chosen from company

64.5 Pct

Two out of three chosen from company

19.4 Pct

Two out of three hired outside

12.9 Pct

All three hired outside

3.2 Pct

Total — 100 Pct

Checks Made Before Final Selection

Before the 200 executive jobs were filled, the following checks were made to support the decision:

METHOD	Cases, Pct
Merit rating appraisals	60 Pct
Medical or health records	40 Pct
Psychological test scores	13 Pct

What Experience Is the Most Valuable?

"What three business experiences that an individual may have on the way up do you regard as most valuable to his future success as an executive?"

Table below shows those mentioned by at least ten of the sixty-two presidents.

BUSINESS EXPERIENCE	Mentions
Varied work experiences in different departments	46
Working under an able executive	43
Given responsibility or difficult job to do	14
Selling experience	14
Training in human relations skill	10
Serving on company committee	10

be problems demanding the immediate attention of management. "Fire fighting" works against long-range planning.

Merit Rates High—While viewpoints on planned versus natural selection of executives may vary all over the lot, the presidents surveyed were in pretty close agreement on the methods used to fill management vacancies—and the experience needed for those who would become executives.

When asked by what methods they estimated executive positions were filled in most companies today, merit was given the outstanding position. It was reported as the means used to fill 55 pct of management posts, and outnumbered the other five methods combined.

Next closest to merit was the automatic method whereby able men come to the top.

Promotion From Within — The desirability of promoting from within the company was given top billing by a majority of presidents. When asked how the last 3 executives vacancies in their firms were filled, forty out of the sixty-two said all three were filled from the inside.

The president in most cases was not alone in making these decisions. In only 33 out of 200 jobs filled was the selection left up to the president or at most one other officer. Usually three or four persons participated and frequently as many as eight. In one case no fewer than twenty individuals were asked for their opinions.

They also report that merit ratings were consulted in 60 pct of the cases; medical records in 40 pct and psychological test scores in 13 pct, before a final decision was made.

Best Experience—There's more than one way for future managers to rise in a company. But the presidents surveyed by the Conference Board put two kinds of experience at the top of the list. These are varied work experience in different departments and the opportunity to work under an able executive.

What Some Firms Are Doing

More and more firms are seeking ways to improve their selection methods.

They point out good management talent can be found in most firms if they only look hard enough.

An executive selection system should be only part of an overall program.

■ There's no question that many companies have a long way to go in learning how to pick executives. Many have no formal programs at all. Others have just started and as yet can see no concrete results.

But some progress is being made. More and more firms are taking the initiative in warding off a future shortage of executives. Their experiences make up the major part of the National Industrial Conference Board's report on executive selection.

From these cases come many practical examples of what companies are doing to locate better candidates for management jobs.

Planned Programs — The most advanced firms have: 1) Drawn up job descriptions for executive positions; 2) Taken an inventory of the background and skills of their employees; 3) Installed testing, rating and appraisal systems; 4) Set up employee development programs.

From a broader view there are two main points those wishing to strengthen their selection of managers should keep in mind. One is that if a company looks hard enough it is sure to find some good material in its own company.

The other is that each year thousands of young men are graduated from American colleges and universities. Among these are many capable of rising to executive rank.

Executive Qualities—Much has been written about the qualities that make a good executive. Lists have been drawn up, tests prepared and any number of methods devised to identify executive potential. Suffice to say that in getting down to bedrock in the matter of selecting executives, the men chosen should be those whose qualifications best match the specifications of the jobs.

Almost all companies studied by the Conference Board have a policy of filling executive vacancies within their own company. Even when a systematic plan is lacking, firms prefer to choose their own people.

Morale Builder—The reasons for

Westinghouse photo

Companies Lookout For Employees Who:

1. Seek more responsibilities / 2. Contribute good ideas / 3. Have "strong character" / 4. Put in extra time voluntarily / 5. Are accepted as leaders by their associates / 6. Have the "right" background (family, educational, etc.) / 7. Have the "essential executive characteristics" / 8. Express interest in getting ahead.

And They Are Taking Steps To:

1. Set up inventories of the skills and abilities of employees.
2. Locate outstanding young people and assist them to continue their education.
3. Aid colleges through gifts of money and equipment.
4. Offer training courses for college graduates, employees, and managers.
5. Support research and publications in these areas.

RECRUITMENT: College students are looked on as good source for future management material. Weirton Steel photo.

How Executives are Chosen

Automatic—Able men come to the top. These "take-charge guys" assert their leadership. All the company has to do is appoint them as the needs arise.

Committee Review—An executive or Board Committee discusses various candidates and selects the most promising.

Compromise—Least unlikely candidate is promoted.

Honors—Man is chosen who has demonstrated his leadership in his profession and community projects.

Ideal—Company establishes ideal standards, and picks the man who comes closest to measuring up. The ideal for a certain position may be set by an executive who has made a distinguished record.

Merit—Hard work and demonstrated ability.

Natural Succession—The "second man" moves up when the first job becomes vacant.

Nepotism—The promotion goes to a relative.

Physiognomy—A man with the "right" combination of facial characteristics is selected.

Pirating—Men who "look good" in other companies.

Politics—Through behind - the - scenes maneuvering, the politician gains a favorable position and is appointed.

Propinquity—An acceptable candidate is on hand, willing and available.

Salesmanship—Man sponsored by the most eloquent, persuasive company officer.

Scientific—All objective records and measurements are collected, including test results and appraisal reports, and the man who stands highest is chosen.

Seniority—Promotion is determined by length of service, other things being equal.

Talent Scout—Ask an executive recruiter to locate a man.

Test Results—Some companies pay great attention to high test scores in selecting new executives. Or they may lean too heavily on evaluations made by psychologists.

this are obvious. A promotion-from-within policy builds company morale. Also, most firms would rather settle for one of their own employees, with lesser qualifications, than gamble on an outsider.

But the better-managed firms are taking their promotion-from-within policy a step further to insure a number of good candidates for every management job. Personnel inventories are kept in pretty much the same manner as materials inventories.

Information about each employee is coded, punched on cards and cross-indexed by age, sex, department, job level, training (formal, on the job, etc.), skills, test scores and other important data. While all firms may not need as elaborate a method as this, some variation of it is bound to pay off.

Fast Method—In this way those who may qualify for executive openings can be located in a short time. If the records don't turn up worthwhile candidates, the company may then be forced to look outside.

When this happens it is important to tell those concerned with the new appointment the reasons why an outside choice was made.

Another advantage of the personnel inventory is that it keeps good management talent from becoming "buried." "Burial" can be due to geographical location, faulty placement, seniority, or specialization.

In some cases supervisors have been known to give employees poor ratings to hold them in their departments. To prevent this the management must make a special effort to obtain the supervisors' cooperation in its search for management material.

Post Job Notices—If a company adopts a promotion - from - within policy it should tell everyone.

This can be done by first making sure that every employee knows and understands what the company policy is. Employee handbooks, supervisors' manuals and foremen's meetings are excellent places to make a start.

Some firms reporting to the Conference Board say they have further implemented this policy by posting notices of job vacancies and setting up job bureaus to encourage employees to nominate themselves for higher positions. They report good results on the quality of candidates who have come forth.

Selection Plans—A selection plan preferred by some firms is called the "progressive hurdles" type. Here a prospective manager is given a number of assignments or "hurdles" to overcome. If he makes good on the first test, he is advanced to more difficult ones. If not, he is rejected. Finally, the most qualified reach the top.

The "proving ground" method is another approach to picking future managers. Juniors are given "Assistant to" or "Acting Director" titles, placed on Junior Boards, assigned to committees and urged to participate in civic affairs.

In these situations candidates have a chance to show their abilities. If they fail the danger is not too great. But unless a man is held responsible for certain accomplishments during this period, it does not constitute a real test of his ability.

College campuses are a favorite hunting ground for future management material. Graduates are sought after not just because they have a degree but because companies feel that anyone who perseveres through this higher training is apt to make a good manager.

Check Performance—College recruitment is a long-range method, taking from ten to fifteen years to pay off. Oftentimes firms which seek after graduates will not get the best candidates unless they have well established training and development programs to offer.

In judging an individual for promotion to executive status, a man's performance record is almost invariably the first thing checked. Success in minor assignments come first in most companies, particularly where the assignments bear a close resemblance to the higher position.

But getting a true picture of a man's record is not easy. Opinions of supervisors can vary and objective standards for judging may not be at hand.

Despite these drawbacks, almost all companies which report progress in choosing executives use several methods for getting a "line" on a prospective manager.

Need Overall Plan—Merit rating reports are used and invariably the opinion of more than one former supervisor is sought. Practical personnel inventory records are developed and consulted.

Many firms also retain the services of medical experts to determine a man's physical fitness for an executive position. In most cases a thorough examination is made rather than a brief clinical study. Psychological test scores are taken into consideration as well.

The companies surveyed by the Conference Board take many different approaches to the problem of executive selection. But the most advanced have similar characteristics which stand out.

All see the need for advanced planning. They are also of the opinion executive selection is not successful unless it is integrated in an overall company plan for recruiting, selecting, training and developing employees.

Affects Policy—Programs for executive selection cannot be divorced from other company efforts to develop better management people. Overall policies as well as training matters are concerned.

If one area is neglected the overall program suffers. For example, no matter how well planned a training program is, it cannot be entirely successful unless the right people are chosen in the first place.

Tips on Picking Executives

"Do you have any suggestions about the selection of executives, a formula or a special procedure that you have found especially helpful or reliable?"

This final question answered by forty-two presidents reflected a variety of personal views. Merit was given top billing. But natural selection was also mentioned frequently.

Alertness

"I still believe that executives of the leadership type are 80 pct born and 20 pct made. Acquiring them requires alertness in searching them out and an ability to recognize them when found. Apprenticeship under an able executive who can teach the candidate will then develop the latent talents."

Past Performance

"The only formula I know is that the better you know a person and the more information you can get about his past performance, the easier it is to judge his fitness."

Difficult Times

"Our experience seems to show that men who had been in positions during difficult times were made stronger and proved to be good executives in higher-rated positions in the company. Difficult times that require close management tend to develop good executives."

Four Steps

"A four-step approach is suggested:

Eastman Kodak Photo

"1. Carefully prepared position description and individual specifications.

"2. Adequate number of candidates to interview so that evaluation can be made.

"3. As many checks, on past performance and future potential as practical, i.e., verbal references, physical condition, psychological appraisal. At least three persons to help in selection.

"4. Checks on social aptitudes as well as business, i.e., does he 'fit' both company and community."

Ex-Officers

"In our company we try to keep a good supply of young, healthy, university-trained, ex-Armed Service officers on the lower rungs of the ladder. With enough of these men in the company we do not need to worry about suitable senior executives when we require them."

Understudy

"Have an understudy for every key position. Do not procrastinate if he does not show the capabilities to 'carry on' in the absence of his superior—try someone else. If every key position is really 'covered,' any contingency that may arise is provided for."

Personal Data

"I seek evidence of the following characteristics: 1) Emotional maturity 2) Creative imagination 3) Business comprehension 4) Human understanding 5) Personal integrity."

Thoroughness

"All key men are formally tested for aptitude, interest, capacity, intelligence, etc. Their performance is watched. Where performance and test results are both favorable, the man is given additional opportunities, responsibilities and training. Formal training is given after promotion—not before. It is our practice to 'clear' a major promotion with every man who may rightfully expect to be considered for the job. The opportunity is discussed with each and the losers are always notified of the choice before the winner—giving them a chance to say that they were 'consulted.' "

Hard Work

"Only known formula is the desire to succeed that sublimates home, community and other interests to desire to become successful through long hours of arduous labor."

Psychologist

"Recently we have engaged an industrial psychologist whom we have found very helpful not only in the area of executive selection but also in executive development. Top management can and should obtain such a tool-help, as it most surely will pay off in the end."

Responsibility

"We think a man can be trained in techniques. But he can only develop executive capacity by demonstrating (on a job where he has authority and responsibility) that the organization he is managing can get results. We first train, but then we give the man a chance without staff interference (but with staff help if he wants it) to show what he can do and how he reacts to mistakes."

Recruiter Speaks Up

Here is a comment made to the Conference Board by an executive recruiter:

"Our job is a tough one. A company president will call us in and say, 'We need a new vice president for manufacturing. Now here's my idea of what the job calls for . . .'

"He goes on for some time. I get his thoughts and then he suggests I see two or three other officers. This is supposed to fill me in and give me a clear picture of the company, and its current situation, especially in the manufacturing division. But I end up with anything but a clear picture.

"Half my job — and it's the toughest half too—is getting the companies to decide what they're looking for when they give me an assignment."

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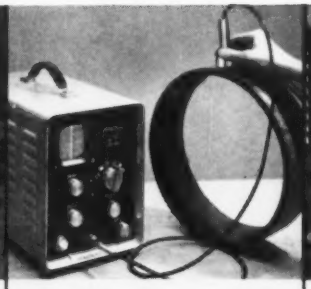

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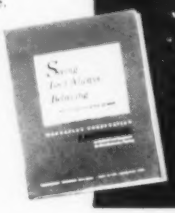

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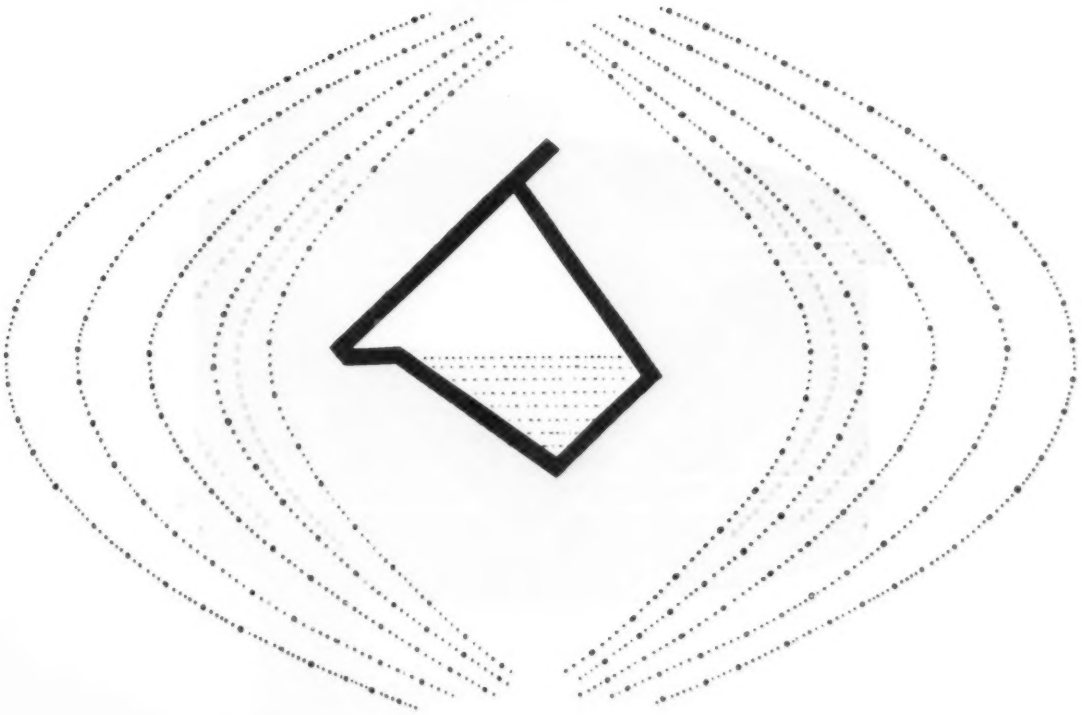


Vacuum melting was built around an Ajax induction furnace

WRITE FOR THESE 2 BOOKLETS

Learn how the fascinating history of induction furnaces led to the solution of many of today's melting problems... how you can apply this technology to your own operations... what you can expect in the future.

Induction heating melting

AJAX

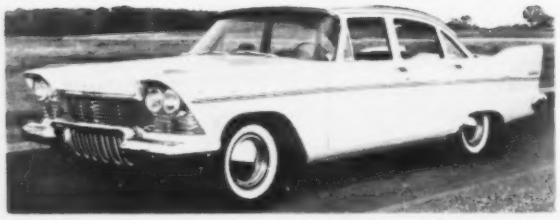
NORTHRUP

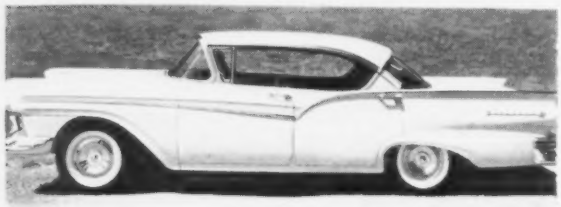
Vacuum melting, as we know it today, combines "ideal" vacuum equipment with an induction furnace. But in 1920, Ajax had the induction furnace, and decided not to wait for the "ideal" vacuum.

In that year, Ajax began supplying 5 lb. vacuum furnaces to industry. Ajax still supplies vacuum furnaces, but in capacities up to 2000 lbs. In fact, of all the vacuum melting equipment installed during the past ten years, the majority have been built around Ajax-Northrup induction furnaces and controls.

If you are interested in pioneering the new "super alloys" through vacuum melting, Ajax experience can be of inestimable value. Write for the booklets shown opposite to find out why. Ajax Electrothermic Corp., Ajax Park, Trenton 5, New Jersey.

ASSOCIATED COMPANIES: AJAX ELECTRIC COMPANY—AJAX ENGINEERING CORPORATION





How 1957 Output Compares with 1956

Chrysler	Up	51 pct
Ford	Up	17.5 pct
General Motors	Down	11.5 pct

Flared Fins Pace Auto Sales

Radical styling is selling more cars for Chrysler Corp. and Ford Motor Co.

General Motors will try to catch up in last quarter changeover.—By H. R. Neal.

▪ The bold plungers are winning their bets in the annual gamble for the car buyers' favor and dollars.

A look at the production performance of automakers through the first five and one-half months shows that fins have caught the public fancy. Cars with the high-flying flared fins are soaring, the others are settling gently to earth.

People who give prizes have also been impressed by the fin school of styling. The Industrial Designers' Institute last week selected Virgil M. Exner, Chrysler Corp.'s director of styling, and his team of stylists for the Institute's Transportation Design Award.

Similar But Different — The Chrysler Corp. stylists were commended for "establishing continuity of design in the company's five lines of 1957 cars while maintaining separate design identity for each individual line."

Exner's styling team is the reason for Chrysler's showing this year. A showing which has contributed greatly toward improving this year's auto picture over a year ago.

The flaring fins of these lines haven't pleased everyone. Some of the deep social thinkers, long hairs, cartoonists and satirists have had a field day at their expense. But, as a group, they buy few cars and Chrysler executives apparently aren't worried

Higher Output — Auto industry production as a whole is up 5 pct in volume.

Broken down into price class, the figures reveal some interesting facts. In these times of reportedly hard money, production of high price cars is up 15.5 pct and shows the largest gain. Output in the low price group is up 7.3 pct. Medium price cars haven't quite held their own and are down 0.8 pct.

Broken down by manufacturers making major body changes, all but three have registered gains over last year. Where the gains have been made, they are very substantial. They range from 17 pct for Ford to 331 pct for Imperial.

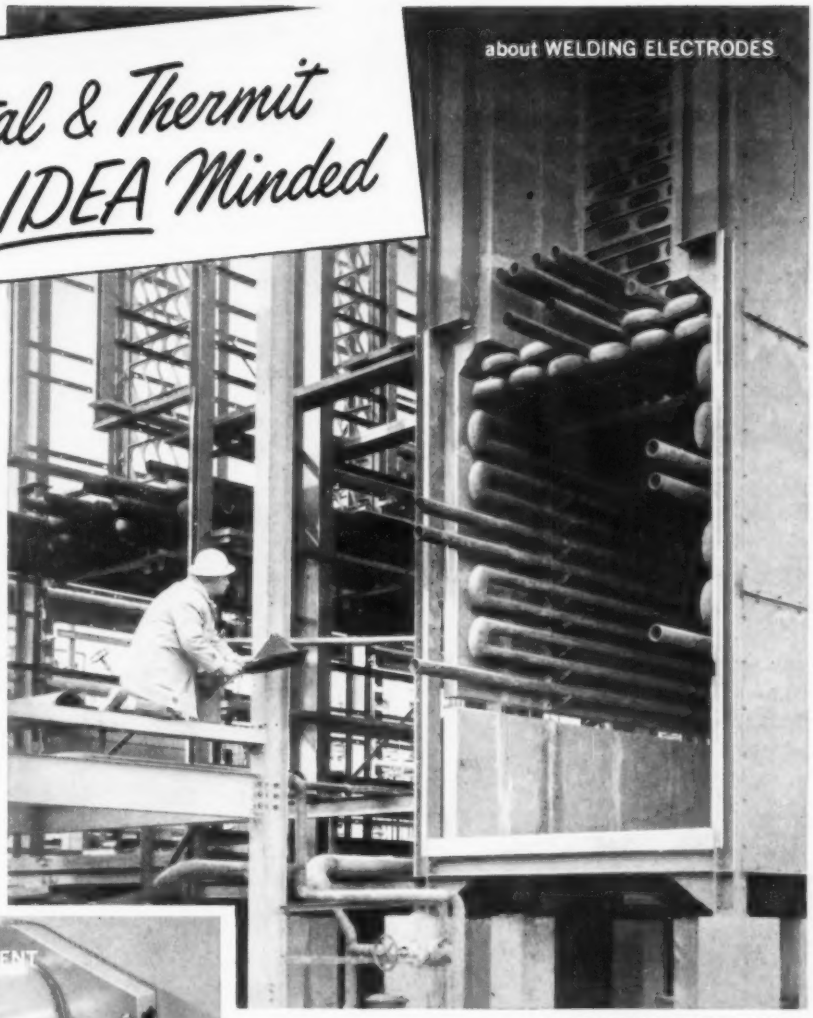
Where They Stand—Three producers making major body changes have seen their outputs fall in varying amounts. They range from a minute 0.2 pct for Cadillac to a significant 26.2 pct for Buick. Oldsmobile is 10 pct below a year ago. None of these belong to the flared-fin school of design.

With two exceptions, every one of the manufacturers showing gains have made bold changes in styling. The exceptions are Pontiac and Rambler. Pontiac and Rambler are up 2.6 and 3.5 pct respectively. These are the smallest increases for any makes showing a gain.

Chrysler Leads—Biggest single gain is a whopping 331 pct by Imperial which jumped from 5237 units for the Jan.-June 15 period in 1956 to 22,626 for the same period this year. Imperial may be heading for a 50,000 unit year.

Comparative production figures

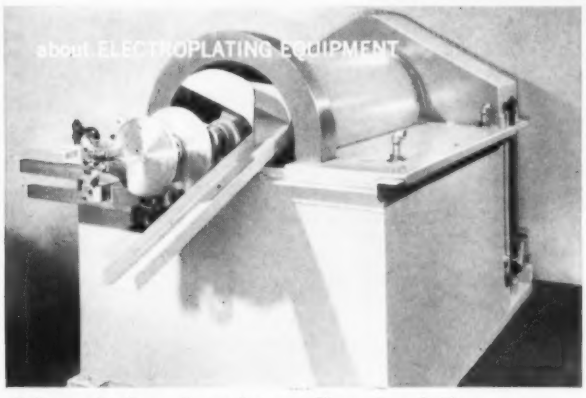
from: Metal & Thermit to: The IDEA Minded



Welding problem solved—production increased

The Blaw-Knox Company, a leading designer and constructor of high pressure, high temperature catalytic reformers for petroleum refining uses special chrome-moly pipe to resist hydrogen attack on furnace tubes at high temperature and to provide desirable creep properties. Welding this alloy had always been difficult. Yet maximum assurance against weld-failure was essential.

Chosen for this difficult job, M&T's Murex® CROLOY electrodes make it easier to obtain high quality welds because maintenance of preheat and postheat temperatures is not critical. These Metal & Thermit electrodes, combined with Blaw-Knox designed unique welding back up equipment, increased productivity of the Blaw-Knox welding crew by a full 50%. They improved weld penetration, eliminated underbead cracking.



A barrel of savings in small parts plating

Chromium plating of small parts is no longer a costly, manhour consuming operation. The unit shown is the new *continuous* Unichrome chromium plating barrel designed by Metal & Thermit. This is a real production tool. It equals 4 batch type barrels in output; plates up to 200 pounds of parts per hour. It brings automation to companies that must chromium plate hundreds of thousands of small parts per day.

Golden-glow bronze finish wins the trophies

Arlen Trophy Company, leading manufacturer of die cast trophies, finds "gold" in the M&T *Golden-Glow* Bronze Plating Process. Cups formerly plated with copper, nickel and gold now get a beautiful-to-behold bronze finish directly on castings. It is the image of 24 kt. gold!

M&T Bronze is also being used in hundreds of installations to replace copper as an undercoat, plating intricate parts more uniformly and twice as fast. It also helps conserve costly nickel.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
CERAMIC MATERIALS
WELDING SUPPLIES
METALS & ALLOYS
HEAVY MELTING SCRAP

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CORPORATION
GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • East Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

How high load capacity is built into less space in Dodge-TIMKEN All-Steel pillow block

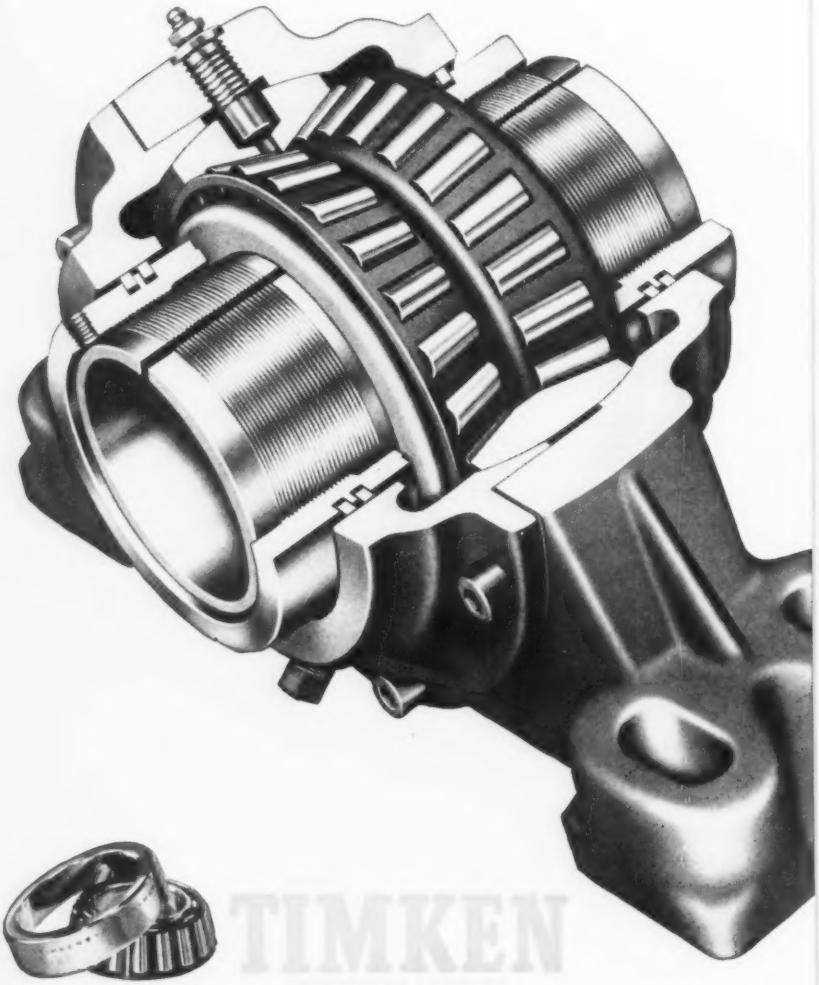
THIS rugged Dodge-Timken pillow block packs more capacity in less space than ever before. All-steel construction gives it extra strength and durability. The design is compact. No special thrust devices that take up extra space are needed—the two-row Timken® tapered roller bearing takes *both* radial and thrust loads in any combination. And full line contact between the rollers and races assures high load capacity.

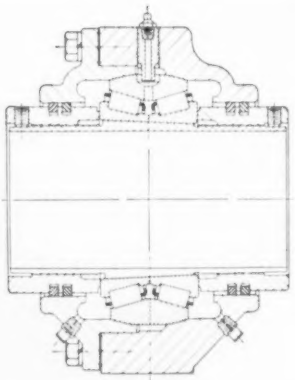
The cutaway view below shows the bearing. It is of special design, with tapered bore and self-aligning spherical outer surface—never requires adjustment. As in all Timken bearings, races and rollers are case-carburized and have tough, shock-resistant cores under hard, wear-resistant surfaces. Under normal conditions, the Timken bearing will last the life of the machinery with which the pillow block is used.

In addition to the all-steel pillow block shown here, Timken bearings are also used in the Type "E", Double-Interlock, Type "C", and Special-Duty pillow blocks—other versatile pillow blocks in the Dodge-Timken line with a wide variety of uses in industry.

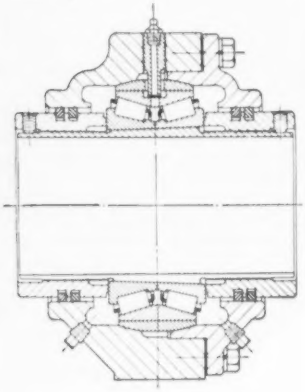
To be sure of the finest bearing steel, we make our own—America's only bearing manufacturer that does. No other bearing can give you all the advantages you get with Timken bearings. Include them in your design plans... specify them for the machines you buy or build. Look for the trademark "Timken"—it's on the bearing that makes any machine run better. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.





How **DODGE MANUFACTURING CORPORATION,** Mishawaka, Ind., mounts Timken bearings in the Dodge-Timken All-Steel pillow block. Above: non-expansion block with fixed bearing. Below: expansion block with floating bearing.



TIMKEN

TAPERED ROLLER BEARINGS ROLL THE LOAD

Automotive Production

WEEK ENDING	CARS	TRUCKS
June 22, 1957	118,538	23,779
June 15, 1957	125,372	22,748
June 23, 1956	105,148	21,688
June 16, 1956	100,689	20,687
TO DATE 1957	3,146,034	552,207
TO DATE 1956	3,073,050	572,763

*Estimated. Source: *Ward's Reports*

for the Big Three show Chrysler is booming along at a pace 51 pct ahead of 1956, Ford is up 17.5 pct, while GM is down 11.5 pct. It should be noted, however, that car makers showing the largest gains this year had greatly reduced outputs in 1956.

Ford Outpaces Chevrolet—Every member of the Chrysler Corp. line has shown substantial gains this year. Second greatest gain is shown by Dodge, up 56 pct; followed by Plymouth, 53 pct; De Soto, 32 pct; and Chrysler, 22 pct. Dodge and De Soto are in the medium price category—the softest market.

Among GM entries, only Pontiac has shown a gain. All other GM makes are producing at lower levels with the biggest loss by Buick.

According to the June 15 figures, Ford has out-produced Chevrolet by about 28,000 cars. It will be interesting to see if Chevrolet can take the production loss from a major body changeover this fall and still come back to catch Ford before the year's end.

Independents Hard Hit — Mercury is the only middle price major-change entry of the non-fin school to show a substantial gain, a 26.9 pct increase. Lincoln, after last year's good showing, is off 12.1 pct so far this year.

At this time last year, Chevrolet was out-producing Plymouth 3.6 units to 1. Similar figures for this year show Chevrolet's lead ratio has been pared to 2.1 to 1. However, Plymouth production capacity is substantially below that of Chevrolet.

The Jan.-June 15 production figures show that the squeeze is still on the independents. Studebaker production is off more than a third and Packard is just half of last year. Much of the Packard reduction can be accounted for by the firm's decision to leave the luxury car market in 1957 and concentrate on the medium price field, which developed into this year's soft spot.

Nash, Hudson May Go — At American Motors, Nash and Hudson are producing less than a third of last year's cars. Rambler's modest increase is undoubtedly due to the firm's concentration on the economy car market. Paring of Nash and Hudson production could be in preparation for the disappearance of these cars from the big car competition. It is reported that these cars will share the Rambler body on 1958 models.

Production of Continental has been stopped and its future is a matter for speculation. With Lincoln taking on some of Continental's lines for its 1958 models, the Continental may emerge as a top model Lincoln.

All in all, the mid-year auto picture compares favorably with 1956. While 1956 was a disappointment to auto makers in general, it was a good year by previous standards.

Heater Booster Warms Cars Quickly

On the hottest day of the year in Detroit an auto heater was introduced which next winter could relieve motorists of daily dread of going out to a cold car in the morning.

An optional equipment item called Minit Heat, the device operates in conjunction with the hot water heater already installed in most cars. It is produced by the South Wind Div. of Stewart-Warner Corp., Indianapolis.

Cuts In Automatically — Minit Heat consists of an atomizing type burner, stainless steel heat exchanger, fuel valve, spark plug, built-in thermostat and coolant inlet and outlet. Separately mounted are a combustion-air blower and an ignition unit.

Retail Distribution — Stewart-Warner claims it will heat a car's coolant to 130°F in a minute.

THE BULL OF THE WOODS — By J. R. Williams

DON'T TRY TO EXPLAIN--I WENT THROUGH TH' SAME THING MYSELF YEARS AGO! BUT IF YOU GOTTA WEAR A TIE, LET'S MAKE IT LOOK NICE AND PRETTY!
THAT'S THE YOUNG FELLER WHO JUST GOT MARRIED! HE DON'T KNOW HE'S BEIN' KIDDED-- BUT HE'LL LEARN!
AFTER HE'S BEEN AROUND ON HIS NEW JOB FOR A WHILE HE WON'T CARE HOW HE LOOKS, AND AS LONG AS HE BRINGS HOME HIS PAY CHECK, NEITHER WILL HIS WIFE!
THE NEWCOMER
J.R.WILLIAMS
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They're both right!

Man on the left claims that Tru-Steel does the best cleaning job at lowest cost. Fellow on the right swears by Malleabrasive. But they're *both* right! Tru-Steel is best on some jobs . . . Malleabrasive is best on others. Different jobs may call for different abrasives but the result should always be the same—the best job at lowest cost per ton of castings cleaned.

Whichever you need, Pangborn has the right abrasive for your job. Our sales engineers are experts on abrasives. Ask the one in your area for his advice or write PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Md.

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It's Time to Act on Bulletin F

Deadline Is Extended Another 60 Days

New depreciation rules may hinge on response to opportunity to give views

Firms have been slow to state their case to Internal Revenue Service despite its importance. —By G. H. Baker.

■ If your firm has not yet given the Internal Revenue Service its views on "Bulletin F" (tables of useful lives of depreciable property), get busy. The original deadline for views (June 30) has just been extended for another 60 days, but the IRS warns that it will not look with favor on another extension.

All firms that either produce, sell, or buy machine tools or machinery are affected. So speak up.

It's Up to You—This is to be the first basic revision in depreciation rules in more than 20 years. Don't waste the opportunity. The adoption of some realistic new depreciation rules hinges directly on the responses.

The government's depreciation experts report a "delayed-response" type of reaction from industry to the government's call for comments on Bulletin F. As late as mid-June, only about 60 responses had been received concerning needed revisions in depreciation rules. Nearly all major trade associations in the machinery industry have submitted comprehensive statements to the IRS, but a surprisingly small number of individual companies have thus far taken advantage of the opportunity to bring about some urgently-needed changes.

Time to Change—There is general agreement, both among buyers of machine tools and tool builders, that Bulletin F is sadly out of date.

Joel Barlow, a leading tax attorney and counsel for the National Machine Tool Builders' Assn., the American Machine Tool Distributors' Assn., and the Metal Cutting Institute, has suggested an abandonment of Bulletin F and the substitution in its place of the "bracket ceiling method" includes a reasonable ceiling on depreciable rates (or a reasonable floor on depreciable lives) by classes of facilities.

Satellite Costs Soar

Efforts to put 20-in. spheres into orbits around the earth are going to cost many times the original estimate of $10 million.

Thus far, an estimated $58 million has been allocated directly on the project, and President Eisenhower is asking an additional million to be added to the appropriation in the fiscal year beginning July 1. In addition, large sums have been spent on the launching rockets.

Wilson Modifies Installment Stand

Wilson Approves — Air Force long-term procurement contracts with industry get an amiable nod from Defense Secretary Wilson.

Mr. Wilson shows he will go along with continuation of buying programs—some of them, at least —calling for deliveries well in the future. He is willing to be shown there's a case for this procurement, even when the Air Force lacks authorized money to pay fully for the items it will get.

Moderate Approach—Thus the Defense Secretary takes a moderate approach in carrying out his ban against installment buying. His leniency has the Air Force saying it finds no evidence that a crippling blow has been dealt its buying activities.

Air Force Secretary Douglas, who made strenuous objections to the Wilson ban, sees no severe damage to procurement plans, under these conditions. Recently he had complained of the possible hampering of some $4.2 billion in proposed purchases.

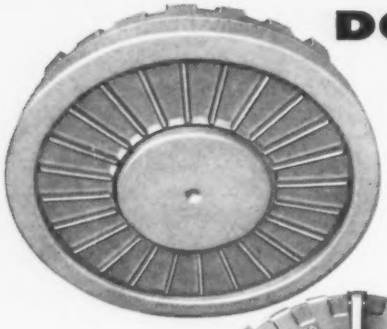
Stretchout at Worst—The worst that may happen, he now thinks, is some slackening of procurement in the next 12 months and a stretchout in certain programs. This stretchout would mean, primarily, that goals now established would be reached at a later date.

Lengthening the time for deliveries, furthermore, would agree with Secretary Wilson's views on the line to be followed by all armed forces. He indicates buying programs will be lengthened and troop strength cut back to keep military spending at not more than $38 billion in the next 12 months.

Mr. Wilson doesn't yet define the amount that procurement will be prolonged, saying only that it's to be a mild action. Military strength may be reduced 300,000.

No Wonder this EC&M Magnet

DOES THE JOB BETTER!



EC&M Type SW All-Welded Lifting Magnets have a new look ...inside as well as outside! They're stronger and better designed to withstand the hard knocks encountered in magnet operation. They're easier to maneuver. And through high-lifting capacity they reduce handling costs.

The magnet-coil is wound between turns with purer, thinner asbestos tape. Its strength has been increased by impregnation with EC&M No. 281 compound. Between layers is a new insulation product, ECAMICA board, which is moisture-free, has high dielectric strength and excellent mechanical ability. A new fabricating process locks the windings against movement.

EC&M magnets are ALL-WELDED to keep pole shoes tight, to keep moisture out, to increase the efficiency of the magnetic circuit and to prolong magnet life.

Write for Bulletin 900

THE ELECTRIC CONTROLLER & MFG. CO.
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7408

Coast Braces for Jet Airliners

Transition Will Be Practically Painless

Talk is all about jet airliners, but don't lose sight of the fact that orders for piston and turbo-compound planes still pour in.

Jet airliners are coming, but will fly with piston-powered planes for decades.—By R. R. Kay.

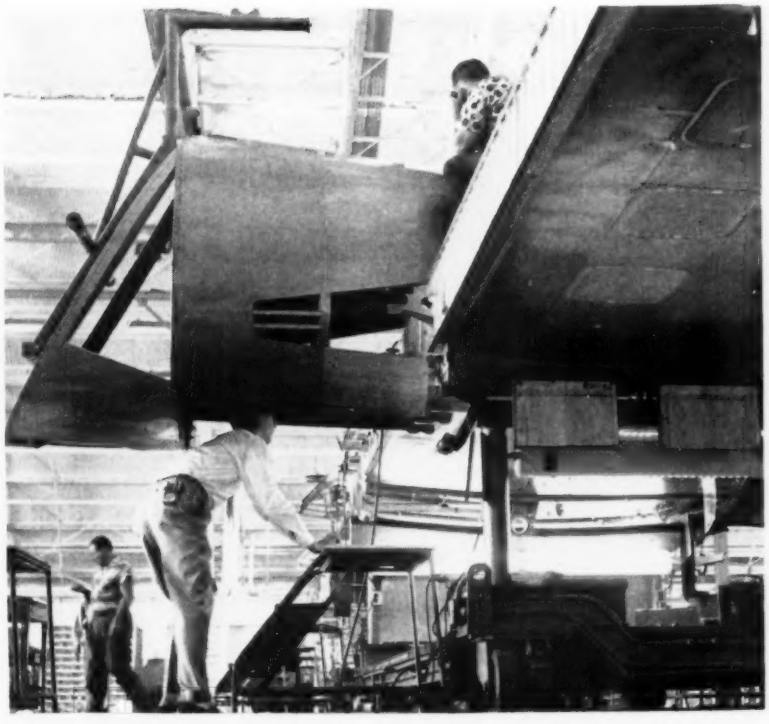
■ Will U. S.-made jetliners push today's transport planes out of the sky? Will the speed advantage spell an abrupt end to the piston-engine plane?

The big builders — Convair, Douglas, Lockheed — don't see any sharp drop in use of conventional type planes for quite a few years. They ought to know. They hold three-quarters of the world's backlog of piston-powered transport business.

Still in Demand—Right now they have firm orders for some 400 piston and turbo-compound ships. That's enough work to keep them busy through 1959. Douglas alone has a backlog of 250 DC 6s and 7s, and more orders are coming in. The company is delivering the planes at a record rate of 15 per month.

Meanwhile, the pure jet transport program is moving in high gear at Boeing, Convair, and Douglas. First planes should go into service late 1959. But the piston-powered jobs will be flying right along with them —probably for several decades.

European Markets Grow—Watch for the European airlines to sharply step up buying of U. S.-made jetliners. They may double their present 66 plane order in the next year or two. Other foreign flag lines are sure to follow. They'll want to shore up their position.



FIRST OUT: Nacelle is installed on the wing of Lockheed's first Electra prop-jet transport, scheduled for its maiden flight next January 31. The 400 mph airliner will be powered by four Allison 501 prop-jet engines.

Aircraft economists say the world's airlines will need some 6000 pure jets and propjets between now and 1970. At today's prices, that's $20 billion in business for planemakers. And the way it looks now, the lion's share will come to the West Coast aircraft companies.

Portland Booms

Keep an eye on Portland, Ore. This wide-awake, bustling Pacific Northwest city is reaching for new industrial honors. In the past few years, metalworking displaced lumber as the city's number one employer. And now the city's port claims Pacific Coast leadership in dry cargo export-import. By a good margin it now leads Los Angeles, Long Beach (Calif.), San Francisco, and Seattle.

Getting Independent

Industrially, the Far West will be getting more and more independent. Ralph W. Seely, vice president-sales, Columbia-Geneva Div. of U. S. Steel Corp., sees it this way: "We are now in the midst of the transition from total industrial dependence on the East to some ultimate degree of self-sufficiency."

5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

The consistently accurate performance of MARVEL Heavy Duty Hack Saws is no accident. MARVEL engineers knew, many years ago, that to produce and maintain accurate cutting-off, a hack saw must be designed and built like a fine machine tool.

Some of the basic design principles built into the modern MARVEL Hack Sawing System that makes it the most accurate cutting-off method you can use are:

1. V-Way Design...Greater Rigidity

Upright and Saddle are precision machined and fitted to form a rigid, integral unit capable of withstanding any cutting load with no deflection or side movement.

2. Anti-Friction Bearing Construction

Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

3. Minimum Blade Frame Reach

Close-coupled design and crank lever action of MARVEL Saws keeps the saw frame and blade reach very short in relation to the vertical V-ways on which the unit is mounted. This insures optimum rigidity, even under the most severe operating conditions.

4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.

5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Write for the MARVEL Catalog and the complete story on MARVEL METAL CUTTING SAWS

MARVEL *Metal Cutting* SAWS

Better Machines—Better Blades

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5700 W. BLOOMINGDALE AVE., CHICAGO 39, ILL.

Tool Rental Policy Set by ODM

Uniform Rates Apply to All U.S. Equipment

The move by Gordon Gray is aimed at protecting defense contractors who use own tools.

Long range goal is unification of all government leasing programs.—By E. J. Egan, Jr.

▪ Uniform rental rates will henceforth apply to all government-owned machine tools leased to private industry. This new policy has just been established by Gordon Gray, director of defense mobilization, in an amendment to Defense Mobilization Order VII-7.

The new monthly rate schedules are based on the original installed acquisition cost of the equipment. In addition, they're graduated according to equipment age at the time it's leased out.

Age Counts—The monthly rate is 1¾ pct of original cost for tools up to 2 years old; 1½ pct for machines over 2 and up to 6 years old; 1 pct for items over 6 and up to 10 years old; ¾ pct for machines that are older than 10 years.

In announcing the new rental policy, Mr. Gray said it applies across the board to all government agencies. He emphasized one of its main purposes. To make sure that firms leasing Uncle Sam's equipment get no competitive advantage over defense contractors who own their tools.

Old Rules Apply — This "new deal" in leasing practices doesn't ease long-standing restrictions on government-tool usage. As in the past, such equipment is reserved for defense production only. It must be used 75 pct or more of the time on direct military prime or subcontracts. ODM can approve leasing for non-defense purposes, but the work must be in the national interest.

Some defense contractors will presumably make monthly rental payments on their leased tools. In other cases, when contracts call for computing a price reduction on the end product in lieu of rent money, the uniform rental rates will apply to such calculations.

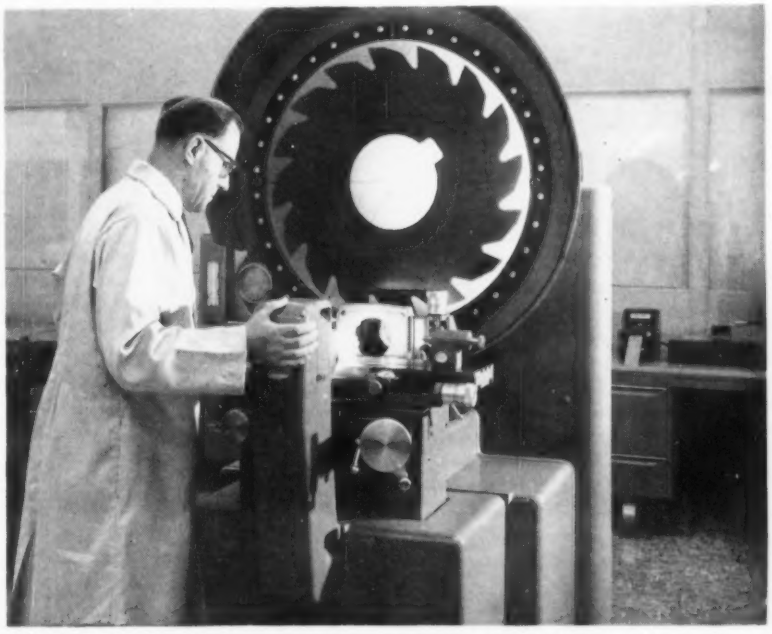
Move to Unify—Establishment of firm rent-rate schedules is Mr. Gray's first step in a program he announced last month. Overall objective of the program is to unify all things pertaining to government-equipment leases.

Other uniform-policy steps the ODM director is considering include: lease terms; purchase and renewal option provisions; restrictions on extent and character of use; maintenance provisions and costs incident to inbound and outbound shipments, removal and other tool-disposition arrangements.

Commercial Financing

There's news from the private-industry front on machine tool financing, also. Commercial Discount Corp. in Chicago says its financing volume for new equipment purchased by Chicago-area metalworking plants is about $24 million annually.

Success of its Chicago-financing plan is responsible for Commercial Discount's decision to offer similar purchase-loan arrangements in other major metalworking centers.



BIG BLOW-UP: Contour projector is an essential equipment item at new IT&T Standards Laboratory, Clifton, N. J. Instrument magnifies profiles of master tools, gages, gears and cams up to 100 times.

INDUSTRIAL BRIEFS

Newest Addition — Borg-Warner Corp. has added control rod drive mechanisms to its list of products. The first units were prepared for shipment at the corporation's Marvel-Schebler Products Div. plant in Decatur, Ill. The mechanisms, precision-machined and rigidly tested, are used in nuclear powered electric generating plants.

Faith in Aircraft—Weston Hydraulics, Ltd., subsidiary of Borg-Warner Corp., has initiated plans for a multi-million dollar expansion of its manufacturing and engineering facilities. A plant will be erected for the development and production of hydraulic and pneumatic equipment for aircraft, missiles and rockets. On the newly acquired site in Van Nuys, Calif., other Borg-Warner divisions and subsidiaries may erect facilities.

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Working on the Second — National Steel Corp. has produced its one hundred millionth ton of steel. Present capacity is 6.2 million tons per year which is composed of three million tons at Weirton Steel Co. and 3.2 million tons at Great Lakes Steel Corp. National Steel's ingot capacity is expected to be in excess of seven million tons per year when the current construction program is completed in 1958.

Minerals Advice — The Atlas Mineral Products Co., Mertztown, Pa., has opened a branch engineering office in Pittsburgh. It will function as a service center to the metalworking industry and provide on-the-spot engineering, design and technical assistance. T. K. Piper has been appointed its engineering manager.

On His Own—Andrew A. Priest, formerly factory manager, Thomas A. Edison Industries, Instrument Div., has formed the Bartley-Priest Co. with offices in Newark, N. J. The new company is a distributor for Sandex Automation equipment and the J. K. A. Dial Comparator and other items for quality control and semi-automatic production processes.

Head Count Award—The U. S. Dept. of Commerce has cited Melvin Martins, electronics engineer, Colson Corp., for his part in the development of a new instrument for the Census Bureau. A gold medal was awarded to Martins by Secretary of Commerce Sinclair Weeks. The instrument transcribes census data brought in from the field into language that can be fed to Univac, the electronic brain.

Tube Expansion—Superior Tube Co., Norristown, Pa., has authorized construction of an office building and factory addition at its general offices and main plant near Philadelphia. Cost of construction, equipment and furnishings will be about $2 million. The project is part of Superior's $5 million expansion program which began in 1956 and is scheduled for completion in 1958.

TOP MAN: New director of the Iron and Steel Div., Business and Defense Services Administration, is Walter H. Leo, on leave for six months from Sheffield Steel Div., Armco Steel Corp. (Courtesy Wire Reinforcement Institute.)

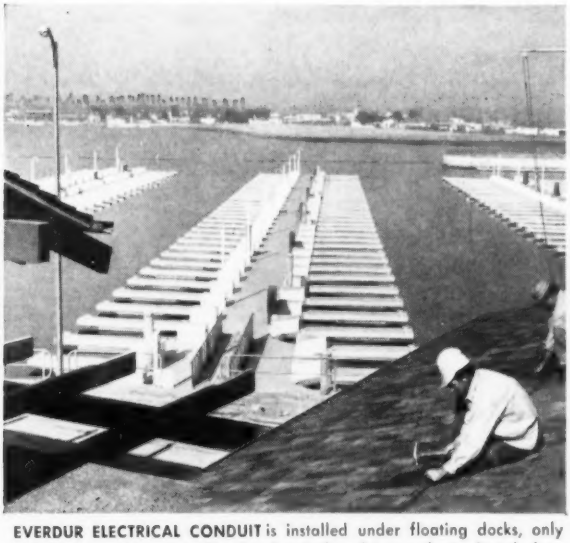
New ASME Officer — O. B. Schier, II, has been designated secretary-elect of The American Society of Mechanical Engineers. He will succeed C. E. Davies, who will retire as secretary after 23 years of service.

Home in Portland — Precision Castparts Corp. has completed its investment casting and shell molding plant in Portland, Ore. It will house the firm's offices, engineering department, tool and die shop, metallurgical laboratory and production facilities.

The Big Picture—Republic Steel Corp. and Bliss & Laughlin, Inc., have received the second annual producers' awards from the American Steel Warehouse Assn. Republic received the award for the best advertising program, while Bliss & Laughlin was honored for the best single advertisement in the interest of the steel distributing industry.

ALAMITOS BAY MARINA BASIN #1, built by the City of Long Beach, Calif: S. E. Vickers, city manager; J. D. Gilkerson, city engineer; B. E. McCune, deputy city engineer; Thomas G. Marchese, project engineer. Engineers: Moffatt & Nichol Inc., Long Beach. Electrical contractor: Ets-Hokin & Galvan, Wilmington, Calif. Everdur Conduit furnished by General Electric Supply Company, Long Beach, Calif.

Over two miles of Everdur Conduit guards electric service at new Long Beach, Calif., marina unit, serving 342 boats



EVERDUR ELECTRICAL CONDUIT is installed under floating docks, only inches above the water. Plug-in electrical outlets are located at lockers by each slip and on lighting standards. *Below:* Everdur Electrical Conduit is available in two wall thicknesses—R. C. and E. M. T.

PHOTOS COURTESY INDEPENDENT-PRESS-TELEGRAM, LONG BEACH, CALIF.

The City of Long Beach, Calif., is in the process of transforming its Alamitos Bay area from tide flats and a massive mosquito factory into one of the finest small boat harbors in the world.

The first boat basin and marina unit, which can accommodate 342 boats, is now complete. The floating docks are well lighted and at each slip, boat owners have plug-in electric service and a fresh water tap. All electrical wiring from the shore out is protected by Everdur® Electrical Conduit – well over 11,000 feet, ranging from ½" nominal size to 3". In addition, all fittings and boxes are of Everdur.

Everdur Electrical Conduit – made from one of Anaconda's copper-silicon alloys—never rusts and offers high resistance to other types of corrosion. It provides dependable year-after-year protection wherever water and corrosive atmospheres are a problem – or where conduit must be buried or embedded in concrete. Everdur is also tough – it stands up under movement and vibration.

For detailed information, write: The American Brass Company, Buffalo Division, Buffalo 5, N. Y. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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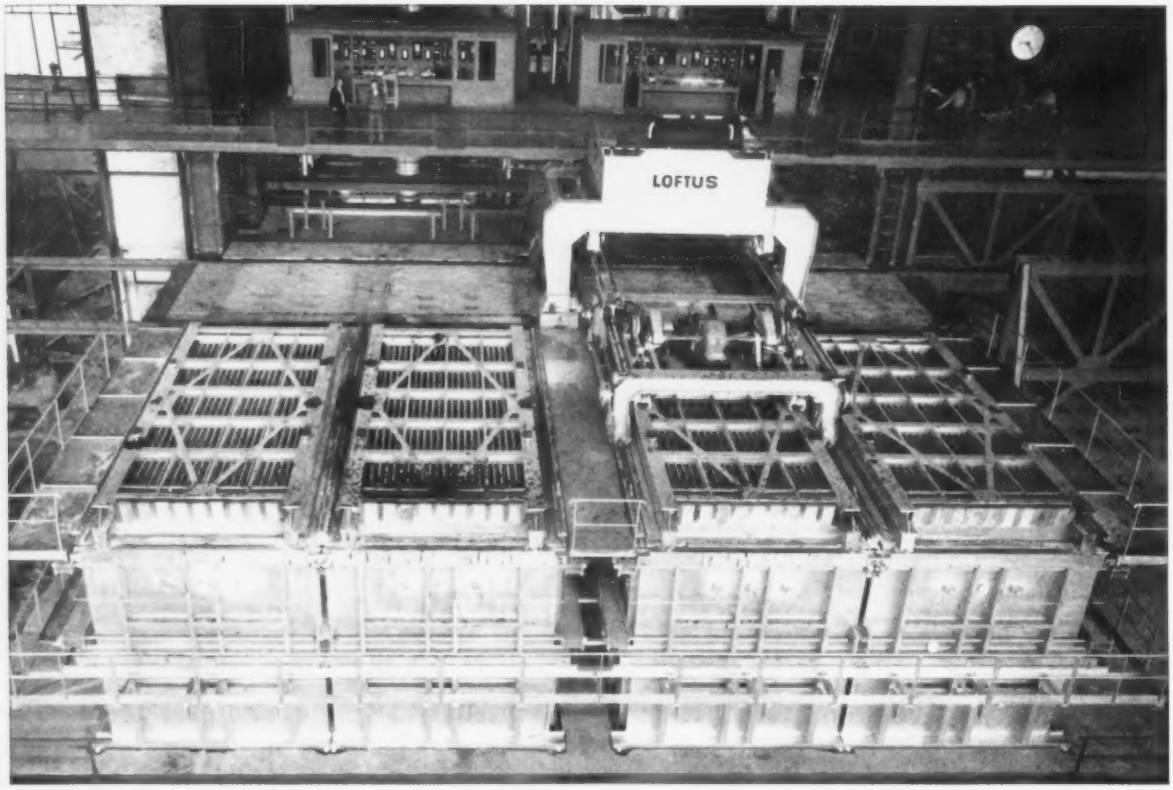
CORROSION RESISTANT • STRONG • NONMAGNETIC • WORKABLE • WELDABLE



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57.16.4

Dr. T. T. Magel, appointed asst. to vice president and technical director, Allegheny Ludlum Steel Corp.

R. M. Briney, appointed president, Haynes Stellite Co.; Div. of Union Carbide Corp.

R. R. Arden, elected president, Robertshaw-Fulton Controls Co., New York; **J. A. Robertshaw,** named chairman of the board.

R. A. Schoenfeld, appointed executive vice president, Lindberg Industrial Corp., Chicago.

R. F. Lay, promoted to vice president and asst. general manager, The Cooper-Bessemer Corp., Mount Vernon, O.

J. C. Mabe, elected vice president, Chicago Pneumatic Tool Co., New York.

Dr. Shadburn Marshall, appointed director, metallurgical research, Central Research Laboratories, Air Reduction Co., Murray Hill, N. J.

D. T. P. May, appointed manager, Kure Beach-Harbor Island Testing Station, International Nickel Co.

N. T. Camicia, elected vice president and general manager, operations, Island Creek Coal Co.

Dr. D. S. Taylor, elected vice president, research, United States Borax & Chemical Corp.; **R. F. Steel,** appointed asst. general manager, Los Angeles.

R. C. Brubaker, appointed controller, The Audio & Recordata Divisions, American Electronics, Inc.

R. E. Mattocks, appointed manager, industrial engineering, Western Brass Mills Div., Olin Mathieson Chemical Corp., East Alton, Ill.

R. W. Saxton, appointed asst. general sales manager, Tranter Mfg. Inc., Lansing, Mich.

C. L. Heintz, appointed sales manager, Valve & Fitting Div., Cooper Alloy Corp., Hillside, N. J.; **R. L. Cohen** and **J. L. Victorine,** appointed asst. sales managers, Foundry Products Div. and Valve & Fitting Div., respectively.

S. D. Saul, promoted to general sales manager, Plasteel Products Corp., Washington, Pa.

J. W. Helsing, appointed purchasing agent, wire and cable products, National Electric Products Corp.

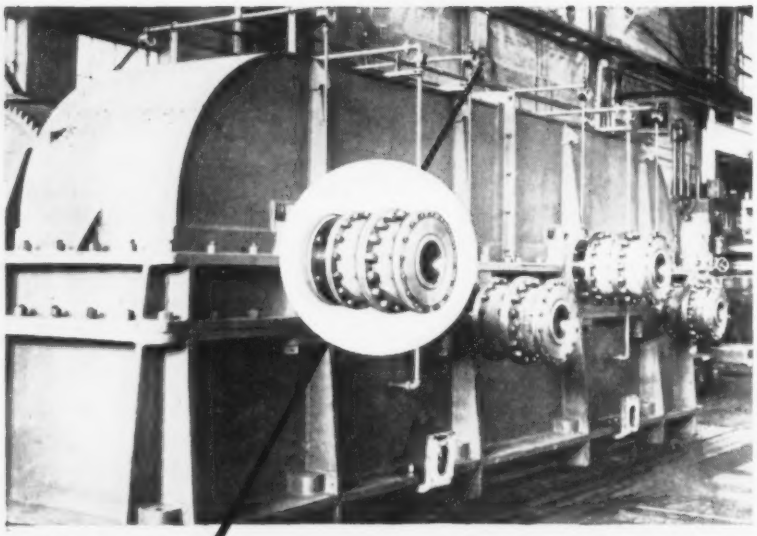
T. A. Fribley, named secretary, The Cleveland Cap Screw Co., Cleveland.

Dr. F. J. Shortsleeve, appointed asst. director, research, Metals Research Laboratories, Electro Metallurgical Co., Div. of Union Carbide Corp.

H. A. Winkler, appointed asst. to the superintendent, Electrical Dept., Republic Steel Corp.

G. C. Woodard, promoted to general sales manager, The Cooper-Bessemer Corp., Mount Vernon, O.

B. C. Huselton, promoted to asst. to the manager, Butler Works,



Waldron heavy duty mill type couplings on rod mill

WALDRON

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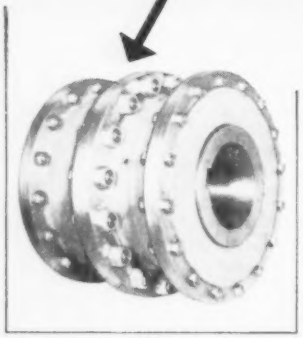

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1 STRENGTH — Hubs and cover sleeves for sizes 1¼ A through 7A are machined from tough steel forgings. Hubs are keyed to the shafts. The two one-piece cover sleeves function as a single, rigid unit serving as a floating connecting link between the hubs. High strength of forgings makes possible a very compact coupling with low rotating inertia.

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3 SERVICE — Plenty of rough bore couplings, already assembled—on the shelf for *immediate* delivery. Finish bored standard couplings shipped to meet customers' schedules. We are geared up to give you realistic delivery on *any* type of couplings.

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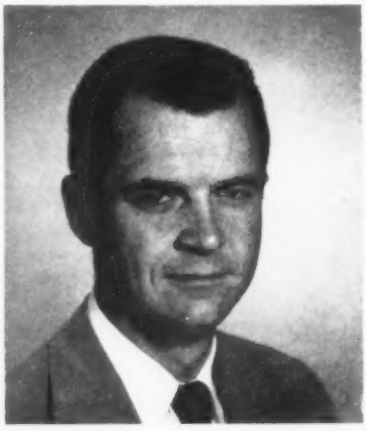
Representatives In Principal Cities
Export Agents—Frazar & Co., New York, N. Y.

Armco Steel Corp., Butler, Pa.; **P. L. McKeever,** appointed asst. works engineer, operations; **W. B. Browning, Jr.,** named asst. works engineer, development and construction.

T. J. Schuetz, appointed sales manager, towing tractor section, The Frank G. Hough Co., Libertyville, Ill.

A. W. Storm, appointed chief engineer, Pelletizing Div., Surface Combustion Corp., Toledo, O.



R. R. Mawson, appointed sales manager, transducer products, Consolidated Electrodynamics Corp., Pasadena, Calif.

B. M. Hamilton, appointed chief metallurgical engineer, and **Dr. R. Clark,** appointed manager, laboratories and research, Atlas Steels, Ltd., Welland, Ont.

V. A. Classen, promoted to secretary and general manager; **L. V.**

(Advertisement)

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

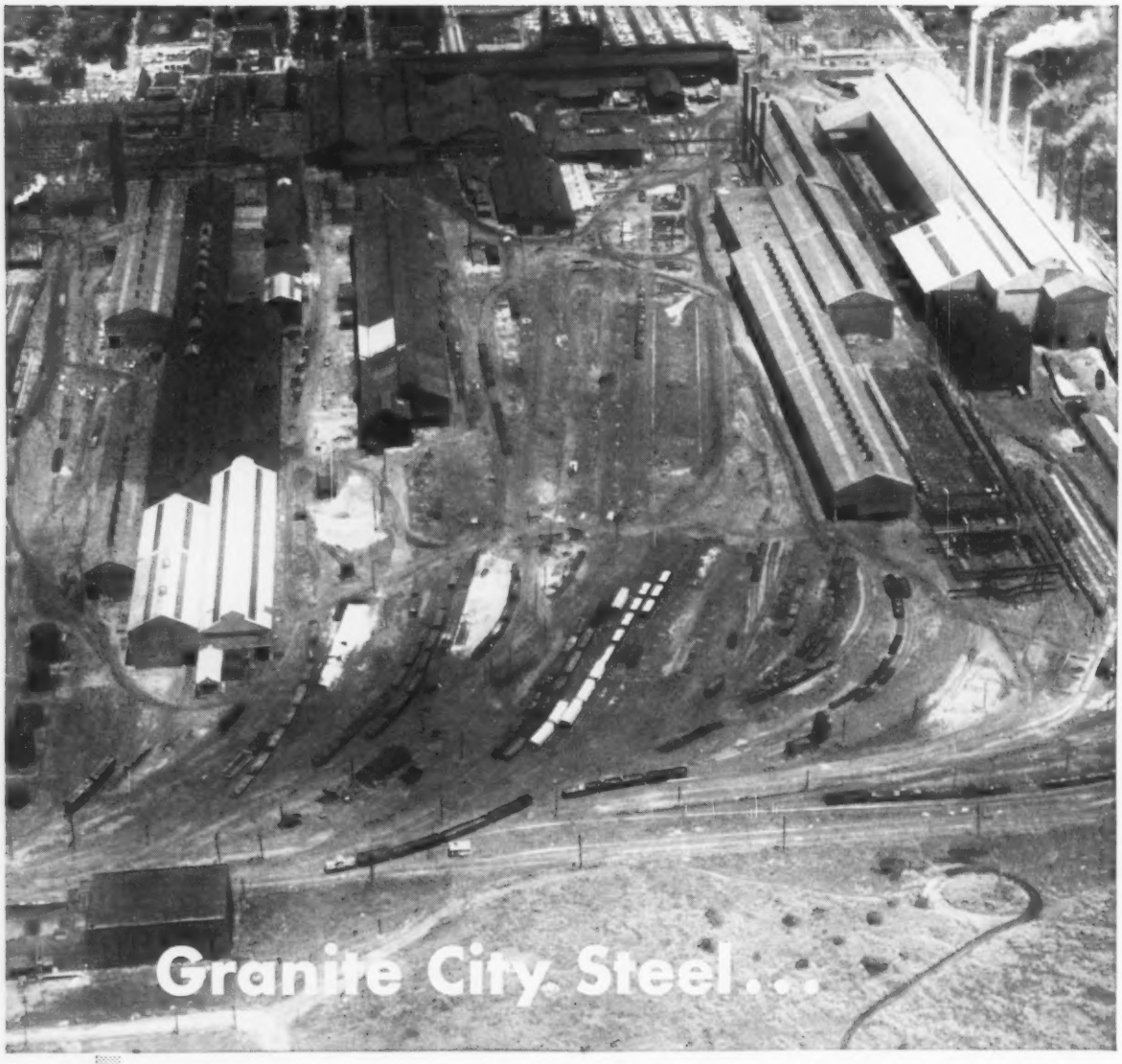
Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.



Where new "tonnage" oxygen generator will augment units with 7 years successful operation

"On-location" generators—designed and erected by Air Products, Incorporated—are producing 8,500,000 cu.ft./mo. of high purity oxygen for Granite City Steel Company. An additional generator is now being installed, and will bring this mill's oxygen capacity up to 57,500,000 cu.ft./mo.

Since 1950, this high purity oxygen has reduced steel making costs by meeting a continuous demand for such operations as welding, cutting and hand scarfing. The new equipment will produce oxygen for use in open hearths . . . shortening the heat time and thus increasing open hearth capacity.

Many steel companies obtain low-cost oxygen from dependable Air Products generators in many combinations of quantity, purity and pressure.

We produce: package, tonnage and custom-built oxygen and nitrogen generators. Let us tell you how you can get dependable, continuous supply of low-cost oxygen. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

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Granite City Steel...

has been using Air Products oxygen generators since 1950. Complete dependability of these units . . . and flexibility in Air Products design . . . has resulted in the installation of another, larger generator at Granite City.

This continuity of oxygen production over the past seven years has been possible only through the use of the dependable "on-location" generators — designed and manufactured by Air Products.

Flexibility of supply at Granite City Steel is a typical benefit resulting from steel companies' use of "on-site" generators. Other steel companies enjoy such profitable advantages as: substantial reductions in oxygen cost . . . continuity of supply . . . dependable production of high purity oxygen 24 hours/day. Even plants requiring limited quantities of oxygen can profitably use Air Products generators.

Let us show you how you can have a dependable low cost supply of oxygen without capital investment. Air Products on-site oxygen generators supply many of the nation's leading steel plants. We'd like to talk to you about them . . . your inquiry is invited. Air Products, Incorporated, P.O. Box 538, Allentown, Pa.

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Key, named plant manager; **W. H. Tankersley,** named purchasing agent, Jones & Armstrong Steel Co., Birmingham, Ala.

R. A. Zuercher, appointed sales and development engineer, Foil Kraft Div., Kaiser Aluminum & Chemical Sales, Inc., Chicago.

W. E. Burgoyne, Jr., appointed sales engineer, New York area, The Abrasives Div., Elgin National Watch Co., Elgin, Ill.

W. L. Fader, appointed asst. general superintendent, Lorain Works, National Tube Div., U. S. Steel Corp.

W. H. Kraus, named asst. sales manager, The West Steel Casting Co., Cleveland, O.

R. F. Ringham, appointed sales manager, Central Div., Chromium Mining & Smelting Corp., Pittsburgh, Pa.

R. A. Hummert, named Seattle manager, DeWalt Inc., Lancaster, Pa.

N. K. Steenhill, named project manager, The Rust Engineering Co., Pittsburgh.

J. E. Albright, appointed manager, sales, Eastern Sales District, Titanium Metals Corp. of America; **D. B. Dik,** named product manager, flat-rolled products.

R. R. Worick, appointed manager, Detroit office, Aero Engineering Div., The Garrett Corp., Mineola, N. Y.

H. N. Hubbard, appointed asst. general superintendent, National Works, National Tube Div., U. S. Steel Corp.

Jim Cavender, promoted to sales engineer, Southern Ohio and West Virginia territory, Clearing Machine Corp.

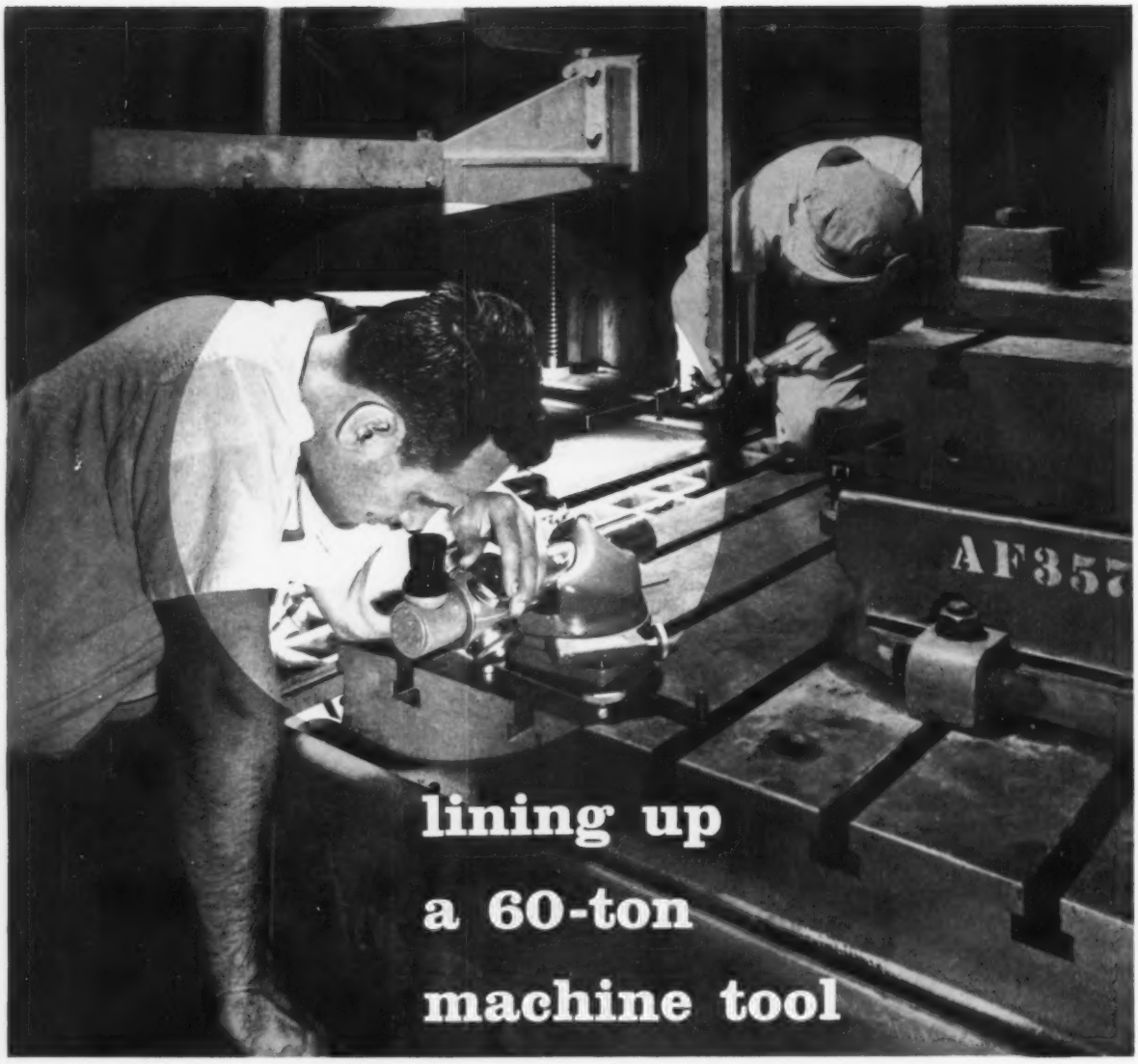
H. H. Herman, appointed field representative, industrial sales, Hypressure Jenny Div., Homestead Valve Mfg. Co., Coraopolis, Pa.

J. J. Jennings, appointed manager, Metal Purchases Dept., National Lead Co., New York.

C. E. Smith, appointed asst. national service director, Robertshaw-Fulton Controls Co.

J. L. Montgomery, named asst. manager, Steel Plants Equipment Dept., Blaw-Knox Co., Pittsburgh.

D. W. Shoemaker, named manager, manufacturing, Corhart Refractories Co., Louisville, Ky.



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Precision three-dimensional alignment to 0.001 inch per foot was demanded in installation of eight 60-ton tracer-controlled milling machines at Alcoa's Cleveland plant. This precision had to be achieved in machines mounted on floating foundations.

McGraw mechanical erection specialists licked this problem with the use of specialized optical equipment imported from England – a micro-alignment telescope with auto-collimation. F.H.McGraw & Company is the first construction company to acquire and master these new precision tools.

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New Process Makes Rolled Steel Directly From Pig Iron

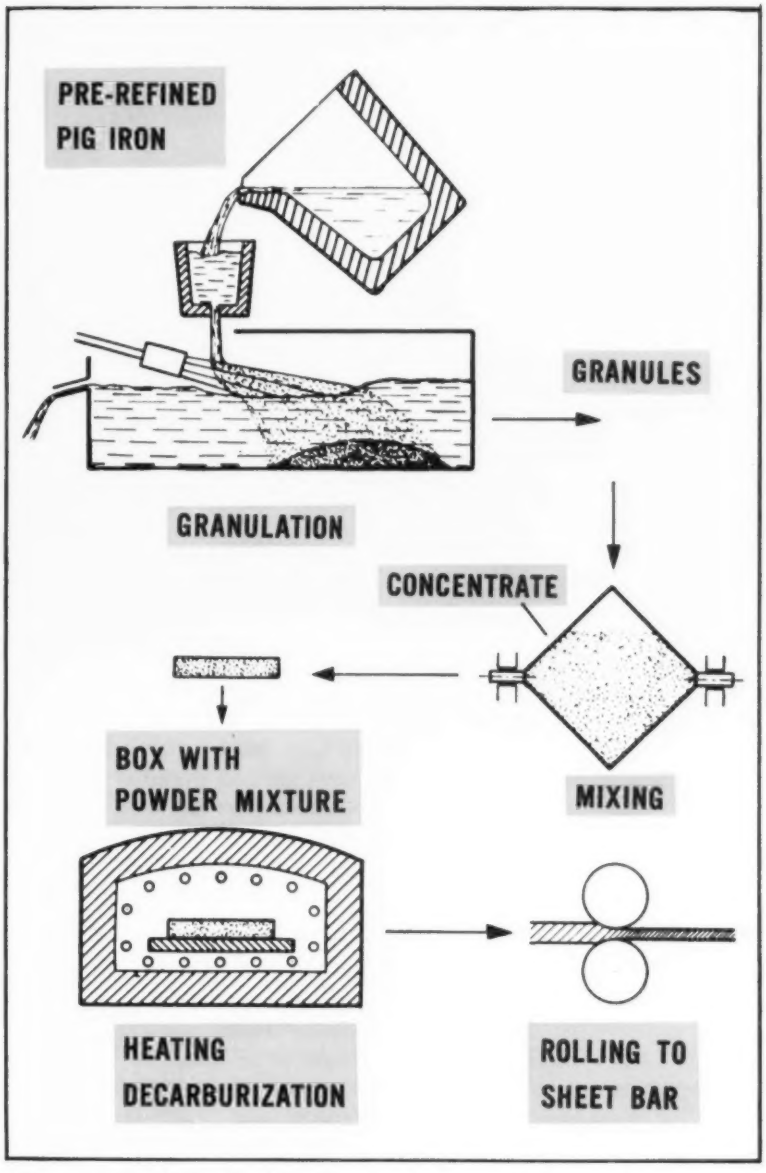

Fig. 1: Flow sheet showing steps in the new powder steel process. It uses standard equipment and can be made fully continuous.

Here, for the first time in this country, are details of a new steelmaking process developed in Sweden.

It's a fresh approach: Instead of striving to eliminate the blast furnace, Swedish researchers looked for economies further down the line.

The result is a simple, inexpensive shortcut to clean, rolled steel—one that merits a good close look.

▪ Many of the new steelmaking methods appearing today aim at direct reduction of ore to steel ingots. A new process developed in Sweden starts with pig iron, but goes a step further in converting it directly to clean rolled steel.

The Stora Powder Steel Process, as the new method is called, was developed at Stora Kopparbergs Berslags A/B, Domnarvet, Sweden, by Bo Kalling, Director of research, and his associates, Sven Eketorp and Sven Backstrom.

It begins with a mix of about 85 pct granulated pig iron and 15 pct high-purity iron ore concentrates. The mixture is packed in a box made of thin sheet steel and decarburized at 1100°C (2012°F). Then, at 1100 to 1200°C (2012-2192°F), the box of granules is run on a standard rolling mill. Rolling

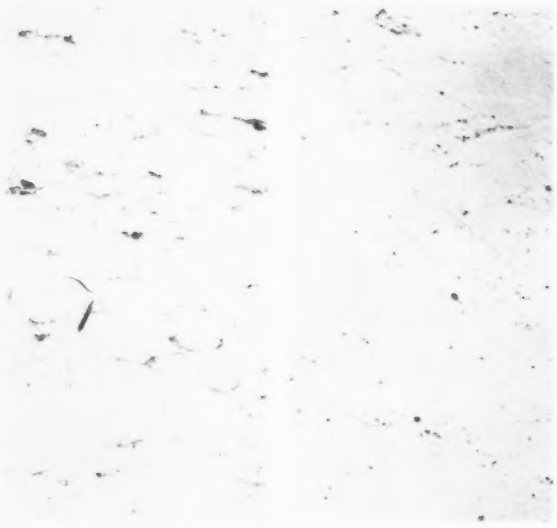

Fig. 2: High silicon content—in this case 0.15 pct—results in numerous large inclusions of precipitated SiO_2. Unetched, 60x.

Fig. 3: Powder steel made from iron prerefined to a silicon content of only 0.02 pct is exceptionally clean. Unetched, 60x.

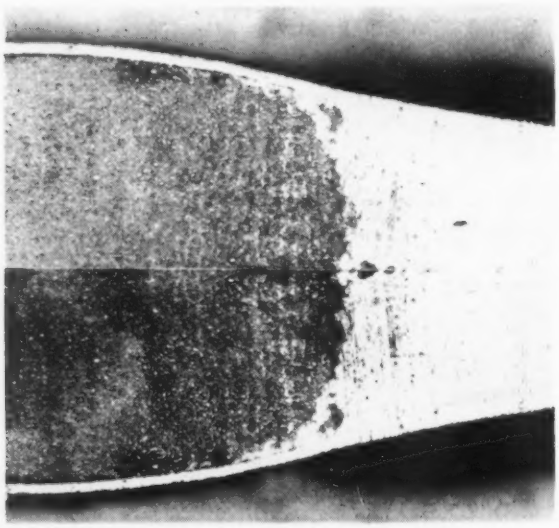

Fig. 4: Section through partly rolled box of powder shows spongy powder mass on the left, solid steel to the right. 0.7x.

fuses the powder and sheet covering into a uniform mass of solid steel. Metal produced by this simple method is comparable in quality to electric furnace steel. It has shown especially good deep-drawing properties. It welds normally. And preliminary data indicate it can be produced for $10 to $20 a ton less than steel made by conventional methods.

Carbon content is easily controlled by varying the amount of iron oxide used. Oxide inclusions in the finished steel are small, few in number and well-distributed. Because there is no segregation, phosphorous content can be relatively high—up to 0.2 pct P without unfavorably affecting quality.

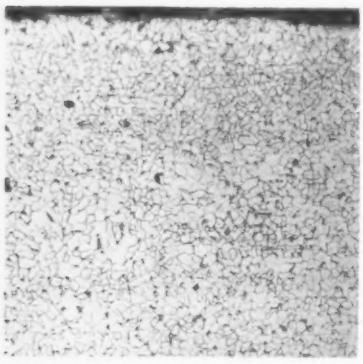

Fig. 5: Typical microstructure of transverse section through 8 mm hot-rolled sheet normalized at 1100°C. Etched, 100x.

High Output Possible—The new process is well-suited to continuous large-scale production. It uses conventional furnace and rolling equipment. It also offers a simple means for making compound layered steels.

Various steps in the process are diagrammed in Fig. 1. The raw material is a normal open-hearth pig iron with the following average analysis: 4.3 pct C, 1.1 pct Si, 0.9 pct Mn, 0.045 pct P, and 0.040 pct S. The iron is first prerefined to bring silicon content down to the lowest possible level. This is because the silicon oxidizes to SiO_2 during decarburization and the silicates precipitate on the surface of the original iron particles. Prerefining is currently done in the ladle with an oxygen lance blowing down into the bath.

While this method can be used even where complete removal of silicon is necessary, a rotary Kaldo furnace is preferable because mixing action in a ladle is limited.

Lime addition for refining is regulated to give the end slag a basicity of $CaO\text{-}SiO_2$ of about 1.3. Iron content in the slag will then be about 3 pct. During blowing, ore can also be added—about 3 pct at a silicon content of 1 pct. Iron gained from the ore raises pig iron yield to above 100 pct.

Silicon is Critical—Investigation has shown that silicon content must be kept below 0.05 pct. Fig. 2 shows the steel (rolled as sheet bar) produced from pig iron containing 0.15 pct Si. At 0.06 pct Si the steel is definitely cleaner. And at a silicon content of 0.02 pct, shown in Fig. 3, the typical slag formation around pig iron particles has disappeared.

Granulation is accomplished by pouring molten pig iron against a stream of air, water, or both, coming from a high-pressure nozzle. Particle size may be relatively coarse, just so it's under 3mm.

If iron ore concentrate is chosen as the decarburizing medium, it should be the purest concentrate

available. The concentrate used at Stora has been cleaned by dry magnetic separation to a SiO_2 content of only 0.10 pct. Total gangue content in the concentrate is 0.3 to 0.4 pct.

Controls Carbon—The amount of concentrate added depends on carbon content of the pig iron; at 3.5 pct C it will be 17 pct of the weight of the total mixture to produce a 0.10 pct C steel. Other oxide additions such as mill scale may be used. It's also possible to supply the oxygen by previous oxidation of the pig iron powder, but yield will be decreased.

After thorough mixing the powder is put in a box. When thin sheet is to be the final steel product, boxes used at Stora measure 1000 mm long, 250 mm wide and 60 mm deep (about 40 x 20 x 2.4 in.). This corresponds to a weight of 70 kg (about 154 lb). Plate thickness is usually 1 to 2 mm (about 0.04 to 0.08 in.).

Next, a lid is welded on top of the filled box. The weld needn't be tight—in fact, shouldn't be so—as gas is generated during the reaction. The amount of gas evolved is about 50 m^3 (1765 cu ft) per ton; the analysis is 90 pct CO and 10 pct CO_2.

Decarburization is accomplished at 1050°C (1922°F) and rolling, which is done directly afterwards, is usually carried out after heating to 1200°C (2192°F).

Standard Furnace Used — The furnace currently being used is a muffle-type unit with Kanthal heating elements. In large-scale operation a continuous furnace of any standard type can be used, just so it doesn't have an oxidizing atmosphere. The gas evolved from the powder mixture during decarburization will in itself guarantee a strongly reducing furnace condition. This gas may be burned in the preheating zone, or still better in radiant tubes in the finishing zone.

Heating time is longer than for billet heating because of the time required to properly diffuse the carbon. Also, the mixture's low density slows heat transfer. Thus, the heating operation will be more expensive both in capital investment and operating cost.

Overall Cost Lower—On the other hand, heating is the only really expensive part of the process. And it takes the place of heating to a molten state in conventional steelmaking processes as well as the normal heating of ingots. Total Btu consumption from pig iron to hot plate bar is definitely lower. Consumption for a gas-fired furnace producing 16 tons of steel per hour is calculated to run 2.6 million Btu per ton. Total time for heating and decarburization is 3 to 4 hours for a box thickness of 60 mm (about 2.4 in.).

The box of decarburized powder comes from the furnace at 1100° to 1200°C (2012-2192°F). Next, it's rolled at Stora on a 750-mm (30-in.) universal mill with 620mm (about 20 in.) side rolls on both sides. Fig. 4 shows a section through the box where rolling was interrupted.

To get full density the box of powder has to be compressed to about half its original thickness. For optimum strength, however, the steel has to be rolled to at least one-fourth the thickness at full density. This means a box 60 mm thick results in a maximum sheet thickness of 8 mm (about 0.3 in.). Fig. 5 shows the typical structure obtained in a hot-rolled Stora powder steel. The sample is a longitudinal section from 8 mm sheet normalized at 1100°C.

Carbon Varies—So far, thickness greater than about 60 mm hasn't proved entirely practical. Thicker boxes usually result in higher carbon content in the middle of the decarburized powder. However, carbon enrichment towards the center isn't necessarily a disadvantage; it may actually prove valuable for certain applications.

One of the more remarkable aspects of the new process is the fact that oxygen content is brought down to relatively low values during decarburization at the same time that carbon content adjusts to the desired level. At 0.10 pct C in the steel the oxygen content (determined by the vacuum extraction method) is about 0.10 pct. This is high in comparison with standard ingot

Fig. 6: Deep-drawing qualities are good. Test pots were made from sheet about 0.04 in. thick.

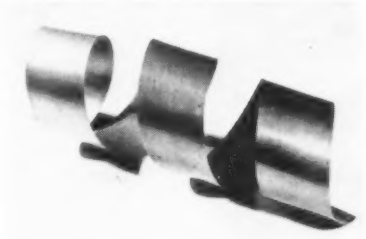

Fig. 7: Strip was hot-rolled to 0.04 in., then cold-rolled to 0.009 in. without intermediate annealing.

PROPERTIES OF STORA POWDER STEEL COMPARED WITH KILLED ELECTRIC STEEL

	Stora Powder Steel	Electric Steel
Analysis: C, pct	0.13	0.13
Si, pct	0.01	0.20
Mn, pct	0.25	0.45
Yield Strength, psi	39,800	38,400
Tensile Strength, psi	58,300	58,300
Elongation, pct	31	28.5
Reduction of Area, pct	65	65
Max. Impact Energy, ft-lbs	76.7	90.4
Impact Transition Temperature, °F	−13	−40

It makes good steel at lower cost—and conventional equipment can be used to set up a continuous, high-output line.

steel, but properties are nonetheless good.

Uniform Slag—Slag inclusions in the powder steel occur in a somewhat different form than in regular steel. Where ingot-steel slag is concentrated in "islands" and larger bands, slag in the powder steel is impregnated all through the steel structure.

Powder steel somewhat resembles wrought iron, but slag content is lower and more dispersed.

Control of carbon is simplicity itself: when the amount of magnetite concentrate added to the granulated pig iron is decreased, carbon content of the steel is increased, and vice versa. But since carbon content below 0.05 pct results in a rapid increase in the oxygen content, the lower limit for carbon in powder steel should be set at 0.10 pct.

Nitrogen content is low, in the range of 0.002 to 0.004 pct. Sulphur is not decreased during the process, but sulphur content of the pig iron can easily be brought down to less than 0.10 pct.

Good Physicals—Table I shows typical tensile and impact properties of a 0.13 pct C powder steel compared with killed electric steel having the same carbon content. The powder steel was forged from a sheet bar 70 x 13 mm (about 2¾ x ½ in.) to a final size of 13 x 13 mm (½ x ½ in.). The two steels were normalized at 950°C (1742° F). Generally speaking, the powder steel has about the same properties as killed electric steel.

An interesting advantage of the Stora Powder Steel Process is that the steel is free of segregation; this is because it's produced directly from powder without melting. In conventional steelmaking processes, phosphorous normally shows a strong tendency towards segregation. In the Stora process, it's possible to use pig iron with rather high phosphorous content.

So far only plain carbon steels have been made. Silicon, chromium, aluminum and other alloying elements are more or less completely oxidized during decarburization. Possible alloying elements are nickel, cobalt, molybdenum and copper; but for the present at least, the process seems limited to low carbon steels.

Good For Deep Drawing—Rolling has been confined mainly to sheet bars with a thickness of 13 mm (½ in.) and widths of 250 to 350 mm (9.8 to 13.8 in.). Sheet made from these bars has been found to have excellent deep drawing properties. Fig. 6 shows some pots made in a deep drawing test. Sheet thickness in this case was 1.0 mm (0.04 in.), plunge diameter 140 mm (5½ in.) and diameter of the flat sheet before pressing 304 mm (about 12 in.). The powder steel sheet behaved at least as well as American car-body sheet.

Fig. 7 shows a strip cold-rolled from a thickness of 1 mm (0.04 in.) down to 0.23 mm (0.009 in.) without intermediate annealing.

Compound Steels Tried—Fundamentally, the Stora Powder Steel Process makes it tempting to try for compound steels. One or both of the two sheets which form the box might consist of, say, stainless steel. Tests have shown, however, that the atmosphere during decarburization is too oxidizing; the oxide formed hinders fusion of the two steels.

It might be possible to protect the surface of the stainless steel in such a way that it won't get oxidized; this is now being studied. Metals such as nickel which will not become oxidized join easily with the powder steel.

The Stora Powder Steel Process is ideally suited to large-scale continuous production. While so far it's been used only on a limited basis, each step has been studied from the standpoint of setting up a high-output, straight-line operation.

One Long Box—In place of separate boxes, a long trough could be formed continuously from coiled strip. It would move on roller conveyors under a charging bin, past a strike-off which levels the powder mixture, and through an automatic welding station that fastens a continuous cover strip in place. Then the continuous box would pass through the furnace and on to the rolling operation.

It would probably be preferable to cut the hot box into suitable lengths for rolling before it goes through the end zone of the furnace. This way, the rolling mill could operate at speeds independent of the conveyor.

A plant where steel production is based solely on the Stora Powder Steel Process would need only a blast furnace (or cupola), equipment for prerefining and granulating, a mixer, furnace and rolling mill. Considerable savings in capital cost and manhours per ton will obviously result.

No Losses — Less obvious but equally significant to the cost picture is the fact that iron yield is exceptionally high. There is no iron loss in slag or smoke; skulls, ingot butts and crops are completely eliminated. Yield of finished steel runs about 110 pct of original pig iron when carbon content of the iron is 3.5 pct. In conventional steelmaking the yield is only 70 to 75 pct. Also, the surface is quite good, so no further surface conditioning is needed.

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Blast Cleaning Makes Fast Work of Large Castings

Cleaning of sand and scale from castings is a routine chore for small sizes. You have a wide choice of method.

It isn't until you get into large castings that the choice becomes limited. But it can be done simply and economically.

■ Large castings demand special treatment in cleaning. It's not that their surfaces need better finishes than smaller castings. It's just that their massive size and weight limit the techniques and equipment by which you can do the job quickly and economically.

A good example comes from a Canadian steel foundry making turbine-runner hubs for a hydro-electric project on the Niagara River. Measuring more than 16 by 5½ ft in size, the castings weigh 70 tons. The pouring weight is 88½ tons; the shipping weight with heads and risers off, 62½ tons.

Airless Abrasive—To handle a cleaning problem of such size, the Steel Foundry Div. of the Canadian Car & Foundry Co., Ltd., at Montreal, uses steel shot blast cleaning. The blast room, controlled by push-button, does the cleaning job in 20 minutes.

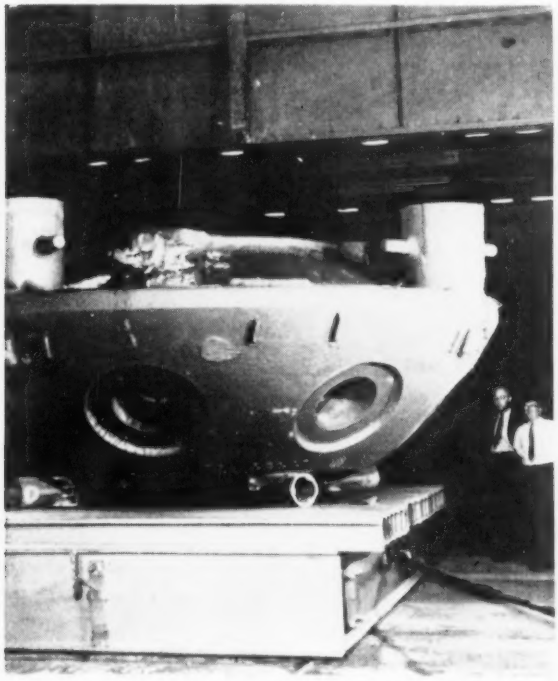
The cleaning equipment, designed by the Wheelabrator Corp., Mishawaka, Ind., cleans 100 tons of work at a time. A work car transfers the castings into and out of the blast room. The car carries either a single large casting or an assortment of smaller ones.

Shot Cleans Work—A barrage of steel shot abrasive material removes all sand and scale while the work car rotates on a turntable. Eight rotating bladed wheels mounted strategically inside the room hurl the shot by centrifugal force.

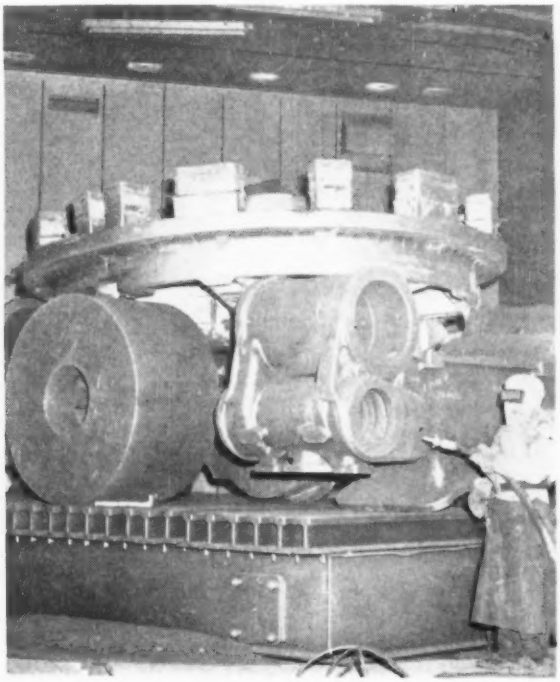
The shot method of blasting does without compressed air. More than 3200 lb of abrasive strike the castings each minute.

The use of steel shot, with its ability to rebound and ricochet, makes it possible to clean sand and scale from cored areas and other cavities. Air-blasting is used for spot treatment of inaccessible surfaces. Operators rarely need to work inside the blast chamber.

The abrasive particles cycle continuously. The reclaimed shot, cleaned of sand and scale, is fed back to the hurling wheels.



MASSIVE CLEANER: Turbine hub weighing 70 tons rolls out of blast chamber free of sand and scale.



VERSATILE METHOD: Work car carries assortment of smaller castings. Air-blast cleans inaccessible areas.

PULLS EASILY: Two men riding order-assembly crane pull sheets at convenient working height.

Three Dimensional Handling Saves Space, Speeds Orders

By O. Summer Hagerman, Jr.—Methods Engineer,
Formica Corp., Subsidiary of American Cyanamid, Evendale, O.

There is no doubt that flat sheets take up expensive floor space. Which direction to go to increase storage?

Go up. Vertical space is there for the asking.

But don't stop there. Get your handling system to go up too.

▪ Increase material stock for customer orders and you get economies in production and improved deliveries. But not unless you can find a handling system to match the increase. Here's a case where a company increases floor space by one-third, but gets a four-fold increase in storage capacity with a new handling system.

Formica Corp., Evendale, O., achieves fast, efficient warehousing of plastic sheets with a combination of special overhead cranes and storage racks. The new setup gets two to three times the previous volume of orders from stock. At the same time the company has saved $350,000 in additional labor and building costs to expand previous handling methods.

Handling Rate Up—The new warehouse area handles up to 10,000 sheets per day. Each of 600 pattern-size combinations of the company's decorative material has separate storage. Total capacity is 200,000 sheets.

And this with less personnel than before. It would work well too with such products as sheet metal, building materials, and paper.

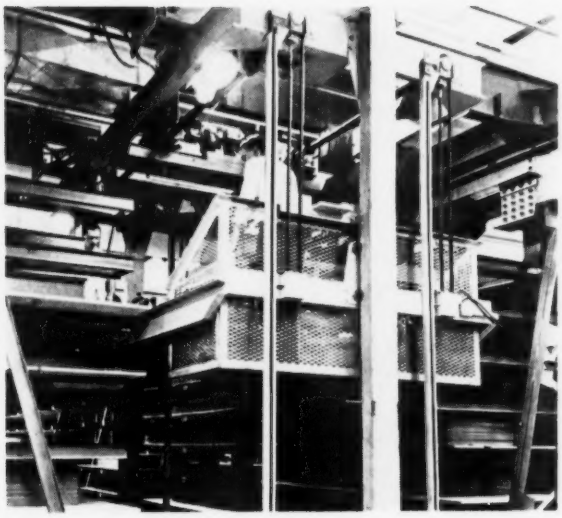
Formica engineers worked along with Chicago Tramrail Corp., the firm that built and installed the crane-rack system. Both cranes and racks use ¾-in. plywood boards in place of ordinary pallets.

Cranes Pull Orders — Each of two order-assembly cranes operates as a mobile elevator platform onto which sheets are pulled from storage racks by hand. Each crane moves in three directions to provide access to all parts of storage area.

A main supporting bridge clears the top of the storage racks and rides on rails running parallel with the main storage aisles. A secondary trolley bridge moves at right angles to the storage aisles, suspended from the main bridge by a monorail arrangement.

The load - carrying platform moves up or down, being supported at its corners by chains hung from the trolley bridge. Rollers stabilize the platform by guiding on two rigid columns hung from the trolley bridge.

Two men ride the order-assembly crane. One man controls the crane and a second assists in handling



CRANE ELEVATES: Up and down motion of crane serves space-saving vertical storage racks.

RESTOCK BY FORK-LIFT: Operator transfers new stock into storage with fork-lift crane.

stock, which varies in size up to 4 ft wide by 10 ft long.

Cross-over from one aisle to the next is done at either end of storage area. The crane has a rated load capacity of 6000 lb and a maximum aisle speed of 200 fpm.

Store By Fork-Lift—Each of two fork-lift storage cranes features four forks, spaced on 2-ft centers to match storage rack spacing. In this way, there's extra load capacity and less flexing of pallets and sheet stock.

The double-column on which forks move up and down rotates to orient the load in any direction. Since aisle widths are only eight feet, the load must be faced to the correct side before entering aisle.

Suspension features for the fork-lift cranes are the same as those for the order-assembly crane. The crane has movement in three directions with 6000 lb capacity.

Efficient Racks—The sheet storage racks provide high load capacity and efficient use of vertical space. Rack arms are four-inch steel channels welded in pairs to 8-in. I-beam columns.

Spacing between columns is four feet with bracing at intervals with A-frame assemblies. Three arms make up a single rack opening for sheets up to 10 ft long. Two arms hold 6-ft and 7-ft sheets.

There are openings from floor to top of storage racks. Each of the eight upper openings holds 140 to 150 1/16-in. sheets including pallet. The ninth opening at floor level provides additional space for large volume items.

The use of ¾-in. board in place of conventional pallets increases the capacity of each opening by 75 sheets.

The overall storage area consists of four parallel aisles. Each aisle is 160 ft long and 8 ft wide. There are over 1000 rack openings.

Plan Order Picking—Since sheets are stocked in a semi-finished condition, orders list sheets which will follow the same finishing routing. Each order-assembly crane handles the orders according to the sizes accessible to each crane. But customer orders are kept together to simplify later packaging. Finally, sequence of sheets is set up to minimize crane travel.

After assembling a load of sheets the crane is brought to head of storage aisles for removal of load by fork truck or by positioning load over a set of stationary forks. A flat-bed truck carries the load to finishing department.

Constant In-Flow — Incoming stock loads arrive around the clock. They get stacked at one end of crane area. To separate the palletized loads, 2 x 4's are used to allow handling by storage crane forks.

Since the order-assembly and storage cranes share the same rails, incoming stock is put away during the one shift each day that order filling operations are closed down.

Most items stocked have two rack openings. One of the two rack openings is kept free to receive the new stock when it comes in. Before storing loads, all racks are cleared of empty pallet boards with order-assembly crane.

Safety First—All crane operators must qualify for license by taking a physical exam and attending a formal instruction course stressing safe practices.

A safety interlock prevents movement of order-assembly cranes unless both men are in safe position. Limit switches prevent entry into an aisle or crossover until crane is properly centered.

A special indicator light on the storage crane shows when forks are level with rack to prevent spilling of sheets. This is an added safety factor that both protects personnel and prevents sheet spoilage.

New Miller Cuts Fast, Accurate Contours

By W. G. Patton—Engineering Editor

Contour milling has always meant multiple machining operations.

At best you have a hard time with accuracy. Especially so on hard materials.

Here is a contour miller that makes it seem easy. Even on titanium jet engine blades.

■ A new fully automatic machine is contour milling jet engine blades on a high production basis. You can turn out eight precision machined blades simultaneously.

The carbide milling cutters permit high production with good tool life and excellent finish. The steel or titanium blades require only a final polishing without grinding. The cutter removes up to 0.100 in. of stock while keeping a constant tooth load.

Delivery of this machine climaxes a development that began in 1950 with the award of an Air Force Research and Development contract to Douglas Tool Co. of Detroit. Bendix Corp., Vickers Inc., and Austin Special Devices Div. worked on the development as subcontractors.

Careful study resulted in the design of the eight-station machine. Each subcontractor built and proved his unit on a mockup of a single-head machine before the final machine was built by Douglas.

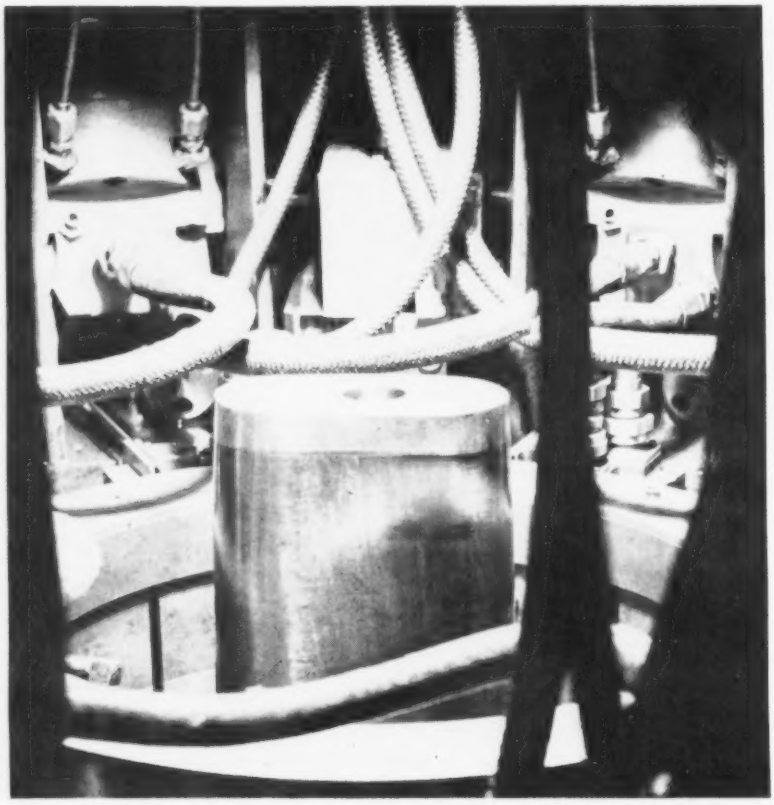
How Good It Is — Recent test runs show eight blades (10 in. long by 3 in. wide) can be profile machined in 90 minutes. Fully loaded with blades, the machine runs 6 hours without attention. You only have to remove the finished blades from the unloading magazine.

Three or more blanks are loaded into the magazines at each machining station at the beginning of the run. Finished blades move automatically from the work stations. At the same time new blades move into position and the cycle starts by itself.

The new machine has a number of unique features. The design of carbide cutters together with variable work-spindle speed makes possible the constant tooth load. This is done despite changing size and contour of blade.

Master Cam Controls — The multiple station machine utilizes nine identical Bendix servo units. The ninth unit follows a master cam and actuates the other units. The cam follower transmits impulses through a computer to the servo units of each operating head.

Controls for the individually operating heads are set up on a band system. Electrical impulses are transmitted to the eight servo motors which drive the work spindles.



HEART OF MACHINE: Follower on this master duplicate of turbine blade signals to computer.

Each head involves the coordination of three specific movements. The milling head, in conjunction with a Vickers hydraulic unit, controls downfeed and in-feed of the cutter. You also have variable speed rotation of the work chuck.

Constant Load — The electrical controls keep the feed rate of the cutter constant in relation to the blade. As the blade widens, the computer slows the work chuck automatically. In this way you get a constant chip load. The work chuck also speeds up at the leading and trailing edges of the blade to compensate for change in dwell time.

By keeping a constant load on the tool you get a clean sharp edge on the titanium blade. There has been no problem of chipping or saw-toothed edges.

If a tool is overloaded, its head withdraws automatically without disturbing the other heads.

Cutter Design — The unusual design of the carbide cutters undoubtedly contributes to the success of the machine. The high helix design insures that the major thrust of the cutting force is directed downward toward the root of the blade and not against it. This greatly reduces distortion.

Cutters are 3.75 in. diam. Up to 3/32 in. can be removed by sharpening. You get little chatter even on tough materials like titanium. Relatively fast cutting speeds can be maintained.

No Matching of Tools—An outstanding feature is that the cutters do not have to be matched. After checking the diameter of each cutter, a simple dial setting transmits through computer the correct in-feed at each station. Dials are graduated in thousandths of an inch.

Test runs show the machine can handle the blades even when the precision forgings are off-centered as much as 0.025 in. As much as 0.100 in. may be removed from one side of the blade while, say, only 0.004 in. of stock is removed from the other side.

FINISHED TITANIUM BLADE: Work chuck turns to release finished blade. Next blade will feed from right.

Oil Mist Helps—Oil mist cooling will be used in regular production, although titanium blades have been cut dry with satisfactory finish. Tests show optimum tool life and a finish of 75 to 90 micro-inch on titanium blades when using oil mist. Provisions for a coolant pumping system have also been built into the machine.

In the event of power failure, a storage battery picks up the load. The machine will then stop at the end of the cycle.

Low cost of retooling is an attractive feature. In the case of a design change, retooling will be less than $20,000. The present machine can be used for blades ranging from 3 to 12 in. long and 1½ to 6 in. wide.

Originally, the machine was designed to remove 0.030 to 0.060 in. of stock from each side of a jet blade. Most blanks run up to the present time require removal of 0.070 in. of material with an accuracy of ±0.015 in. to exceed the designer's expectations.

This is the first machine of the type ready to go into production. It is the result of experience gained from the designing and building of several mechanically actuated machines in the past. Douglas Tool has built a number of four-station mechanical machines for jet engine blades.

STANDARD EQUIPMENT: After extensive tests (see Table III, a tool manufacturer made steam treating standard for these tools.

Steam Treat Tools For Longer Shop Life

By **F. L. Spangler** and **M. E. Lackey**—Leeds & Northrup Co., Philadelphia

You can improve machining output by stretching cutting tool life. By so doing, you save on tool costs, set-up time and re-grinding.

Steam treating helps to achieve this. It puts a controlled oxide film on tool surfaces.

▪ Because machining is a costly operation, a lot of work has been aimed at (1) eliminating the need for machined parts and (2) making machining operations more efficient. One way the second point is being approached is by steam treating tools to give them extra cutting life. Many shops report sharp reductions in tool costs by so doing.

Degree of improvement varies. But many drills, taps, reamers, hobs, milling cutters, broaches and other high-speed tools are reported to last 50 to 100 pct longer. On extra tough cuts, this ratio climbs —sometimes as high as 6 to 1.

Steam treatment follows tempering and finish grinding operations.

Why They Last—The treatment, performed in a Leeds & Northrup furnace which circulates steam by forced convection, puts a tough, hard, porous oxide film (Fe_3O_4) on the tool surfaces. This film is tightly adherent. It's 0.0001-in. thick, is blue-black in color, offers a high degree of corrosion resistance and is sufficiently porous to retain cutting oil well.

These properties are the principal reasons for the longer tool life in many applications.

By retaining cutting lubricant, the controlled oxide film tends to reduce the coefficient of frictional heat developed between the work and the tool's cutting edge. This reduction in frictional heat allows full hardness to be maintained at the cutting edge of the tool, resulting in longer tool life.

Acts As Insulator — The oxide coating also serves to separate the tool from the material being machined. In this way, it prevents chips from welding behind the lip and margin of the cutting edge. Normally, this kind of buildup is one of the chief sources of frictional heat. Less heat means less buildup, and an edge which stays sharp longer.

Another point is that steam treating is done as a final step. Some metallurgists think this is significant, since the treatment — usually at around 1025°F—serves to relieve stresses and strains set up during the finish grinding operation. This leaves a stronger, tougher cutting edge.

Steam-Treating Cycle—The heat treating cycle varies slightly depending on the type of tool and the material. But generally, it consists of heating an empty Steam Homo furnace to 700°F, then loading tools into the furnace and purging it of air by leaving steam flow on for ½-hour. The furnace is then brought up to 1025°F and

TABLE I **Performance of Regular vs. Steam-Treated Tools**

	Race Tool		Rough Form Tool		Finish Form Tool	
	Regular	Steam Treated	Regular	Steam Treated	Regular	Steam Treated
Number of grinds	7	11	7	12	5	11
Pieces Produced	16,672	53,681	16,862	34,589	16,862	55,436
Average piece per grind	2,382	4,880	2,409	2,882	3,373	5,039

TABLE II **Results With Circular Slotting Saws**

		Regular		Steam Treated	
Cutting Speed, rpm	Feed, in.	No. Cuts	Total Cut, in.	No. Cuts	Total Cut, in.
129	2¼	1.5	27	14	252
129	2¼	4.0	72	14	252
70	1½	8.5	153	19	342
129	2¼	9.0	162	18	324

Material cut was SAE 4130 steel, 250 to 275 Bhn.

TABLE III **Effect of Steam Treatment on Drills**

Treatment	Drill No.	1st Test	2nd Test	3rd Test
None	1	33 holes	43 holes	38 holes dull
None	2	31 holes	43 holes	60 holes still cutting*
Blue Oxide	3	62 holes	64 holes	60 holes still cutting*
Blue Oxide	4	50 holes	69 holes	60 holes still cutting

* #2 drill given blue oxide treatment before this test.
* #3 drill given additional blue oxide treatment before this test.
Drills were tested on 2-in. billet of SAE 3240 chrome-nickel steel, treated to 248 to 255 Bhn. Speed of the 37/64-in. drills was 345 rpm at a feed of 0.007 in. per revolution.

the load is held at this temperature for ½-hour.

Tools are then removed, air-cooled, and dipped in oil.

This treatment has been used on many tools with good results since the introduction of the method in 1945, and has become standard procedure in many plants making and using these tools. Here are some typical examples of results obtained, using steam-treated tools on various materials:

Doubles Life—A milling application is interesting. A bar of 1020 steel required the milling of two slots, 21-15/16-in. long and approximately 0.130-in. wide. Two special, 3½-in. diam cutters were used. Without steam treatment these cutters made 150 cuts per grind. After treatment, they averaged 308 pieces per grind.

Drills used for drilling a phenolic terminal plate ⅜-in. thick showed five times longer life after steam treatment. The 3.6 mm diam drill produced 8500 holes per grind following steam treatment, as against about 1700 before treatment.

On another milling application, operators were averaging 25 cuts in milling the ends of Nichrome heater rods, then were spending 20 to 30 minutes changing cutters. After steam-treated tools were made standard in this shop, 150 cuts were obtained. Besides the 500 pct increase in tool life, two hours less setup time was required for each 150 pieces produced.

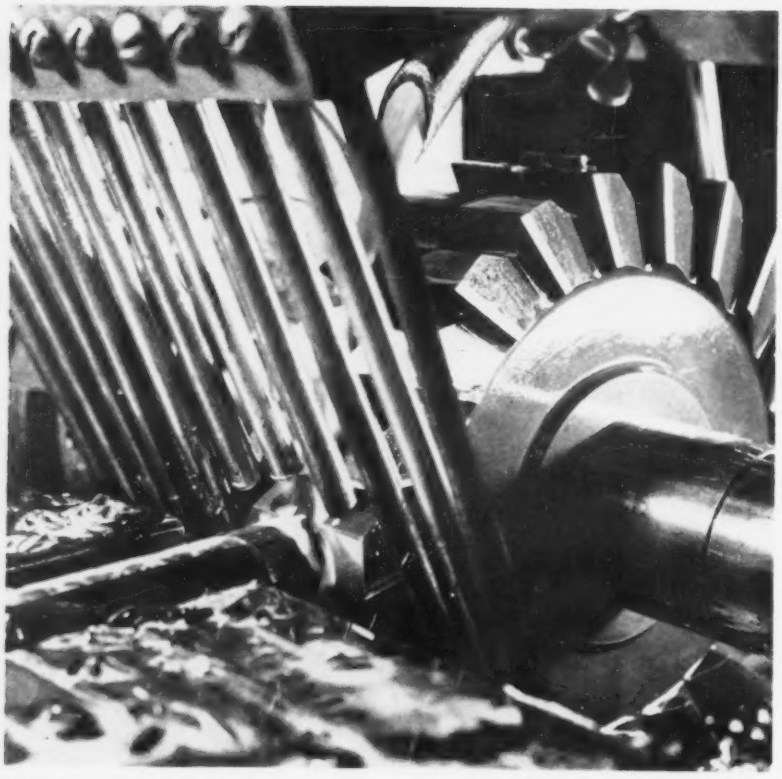
Test Results Shown — Turning out outer races on a National Acme RA6 screw machine requires three forming tools in another shop. Performance tests of regular tools as against steam-treated tools are shown in Table I on this page.

Pickup on the form tool of an automatic screw machine kept ruining parts in another plant, when a batch of formed nickel stock for multipoint switches came through too soft. Experiments with different tool steels and sharpening methods failed to solve the problem. When steam-treating was tried, one tool finished the entire run of 3000 pieces and was still in good condition.

Hobs, broaches, drills and other tools show similarly good results.

Steam-treating, for instance, stepped up the number of parts per grind 62.5 pct when hobs were used to cut teeth on an AISI 3140 steel forged gear, 5.829-in. OD. A similar type hob used for cutting laminated phenolic gears showed an increase of 50 pct.

Broaches used for cutting three surfaces of an AISI 1010 steel latch



MILLS NICHROME: Steam-treated tool now lasts five times longer.

normally ran 20 hours between grinds. After steam treatment normal runs jumped to 70 hours.

600 Pct Increase—On another tough application, a swaged end cup for a conductivity cell, made of KA2S stainless steel, has to be machined and drilled to extremely close tolerances. A study showed that only seven pieces could be completed with one set of tools before resharpening. When steam-treated, the same tools completed 50 parts.

High-speed circular metal slotting saws improved markedly too, as shown in Chart II. These results were obtained in cutting SAE 4130 steel with a hardness of 250-275 Brinell.

Another shop reported a 10 to 1 improvement in life of 4-in. diam. high-carbon high-chrome punches, used for cutting through ½-in. thick steel plates, following steam treatment.

Drilling Data — Considerable data has been gathered detailing results obtained in steam-treating drills. Chart III shows results of some of the extensive tests made by one drill manufacturer before adopting the Steam Homo method as standard for milled flute regular and heavy-duty drills.

Abrasive action resulting from drilling, reaming and counter-boring bakelite insulating blocks dulled tools so rapidly, cracking and chipping resulted. This plant found one tool good for only 10 holes, with an average reject rate of one out of four blocks. Steam treating jumped the average up to 25 holes per tool, and rejects were no longer a problem.

Comparative tests run by another manufacturer on an end-mill tool, ¾-in. in diam, used for cutting 8740 steel forgings of Rc 36-38 hardness, showed these results. Before steam treatment, tools averaged 20 pieces. After treatment, the average was 40 to 45 pieces. A form tool cutting 8740 forgings in the same plant cut 200 pieces after steam treating, as against 30 pieces prior to steam treating.

Taps Improved — A prominent manufacturer of machine tools installed a Steam Homo furnace after running tests on taps. They found that with ¼-in.—28 taps cutting SAE 52100 steel, the number of holes per tool almost doubled, increasing from 1800 to 3000 after steam-treating.

A final drill example. One metalworker received a group of extra-hard castings from his supplier, found his drill failed before one hole was drilled in cleaning out a core hole. The shop foreman had the drill resharpened and steam treated. They then finished the entire batch of 350 castings without resharpening.

Other examples support steam-treating's value on particularly rough cutting jobs. Ordnance specifications required the milling of a 0.250-in. keyway slot into 4140 cold-rolled steel barstock, heat-treated to Rc 34-38 range, in one plant. Tolerances were tight—0.001-in.—and tools could not be resharpened. High speed steel milling cutters produced only four finished parts per tool, due to a vibration problem. Hard-chroming them boosted production to about 11 pieces, and substitution of carbide tools increased the average to 11 to 14 pieces. Steam treating was tried. The first batch of tools treated produced about 100 pieces per cutter, the second 60 to 70 pieces, and the third batch 100 to 125.

Data from tests on hacksaw blades shows steam treatment is useful in improving saw life. Six-tooth blades 14 x 1¼ x 0.065-in. were checked, cutting 3-in. rods of Cyclops 17A austenitic steel hardened to 149-156 Brinell. After their regular draw endurance was 100 pct at a speed of 102 rpm. Substituting steam treatment for the regular draw increased their endurance to 120 pct at a speed of 112 rpm.

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when you specify
Jessop
high-speed steel
When you need a special steel that cuts fast and deep and stays sharp even when very hot, it's pretty certain you'll ask for "high-speed." And if you're looking for assurance of top quality, you are apt to name by name a company that pioneered in the business of making high-speed steels, contributed materially to their development, and has lab and quality-control techniques well ahead of the field. You're apt to specify Jessop.
But you get more than quality when you specify Jessop high-speed steel. You get good service for two very good reasons. First, Jessop has the capacity to supply demand promptly. It can produce more high-speed products, (namely sheets, plates, bars, forgings, castings and special shapes), at one location than any other company in America. And second, Jessop wants all the high-speed steel business it can get and bends over backwards to please its customers. Send in an order and you'll find out.
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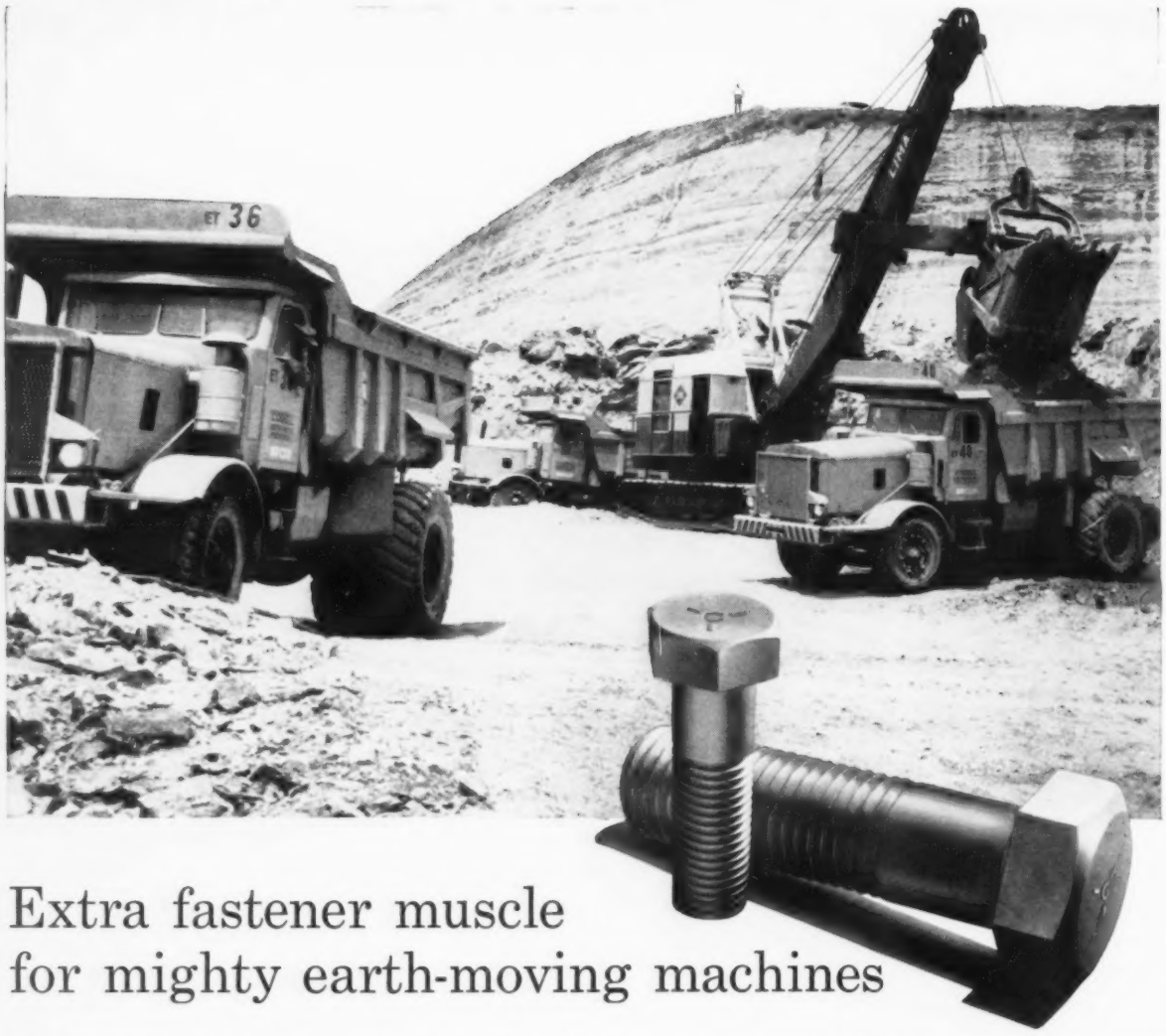
CLEVELAND STANDARD HEXAGON HEAD CAP SCREWS



Extra fastener muscle for mighty earth-moving machines

Power shovels, trucks, bulldozers—all take brutal shock loads and vibration, day in, day out. To reduce repairs and downtime to a minimum, leading manufacturers of earth-moving equipment specify Cleveland cap screws with confidence. These upset forged hexagon head cap screws put extra strength into every assembly, insure customer satisfaction.

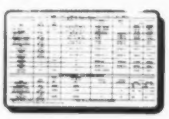
Cleveland standard hexagon heads are manufactured from various steels and in various tensile strengths. Included are extra-large diameters and long lengths. Bright and quenched and tempered steels in all standard sizes are ready for immediate delivery—alloy steels on short notice. Let our experienced engineers help you with your fastener problems. Remember, Cleveland has the most modern of production facilities and the world's largest stock of hexagon head cap screws.

TENSILE STRENGTHS OF CLEVELAND HEXAGON HEAD CAP SCREWS

Product	Size, in.	Tensile Strength, psi
Bright	Up to 7/8 incl. 1/2 to 1 1/8 incl. Over 1 1/8 to 1 1/2 incl.	85,000—105,000 75,000—100,000 65,000 min.
Quenched & Tempered (SAE Grade 5)	Up to 1/4 incl. Over 1/4 to 1 incl. Over 1 to 1 1/2 incl.	120,000 min. 115,000 min. 105,000 min.
Quenched & Tempered (SAE Grade 6)	Up to 3/8 incl. Over 3/8 to 3/4 incl.	140,000 min. 133,000 min.
Alloy (SAE Grade 7)	Up to 1 1/2 incl.	130,000 min.
Alloy (SAE Grade 8)	Up to 1 1/2 incl.	150,000 min.
Bright	Over 1 1/2 to 2 1/2 incl.	55,000 min.
Quenched & Tempered	Over 1 1/2 to 2 1/2 incl.	90,000 min.
Alloy	Over 1 1/2 to 2 1/2 incl.	125,000 min.

Note: Higher physicals, through use of selected alloys, can be supplied on special order.

GET YOUR COPY NOW — Pocket-size card giving you physical properties of Cleveland hexagon and socket head cap screws and Cleveland Place bolts.



THE CLEVELAND CAP SCREW COMPANY
4444-1 Lee Road, Cleveland 28, Ohio
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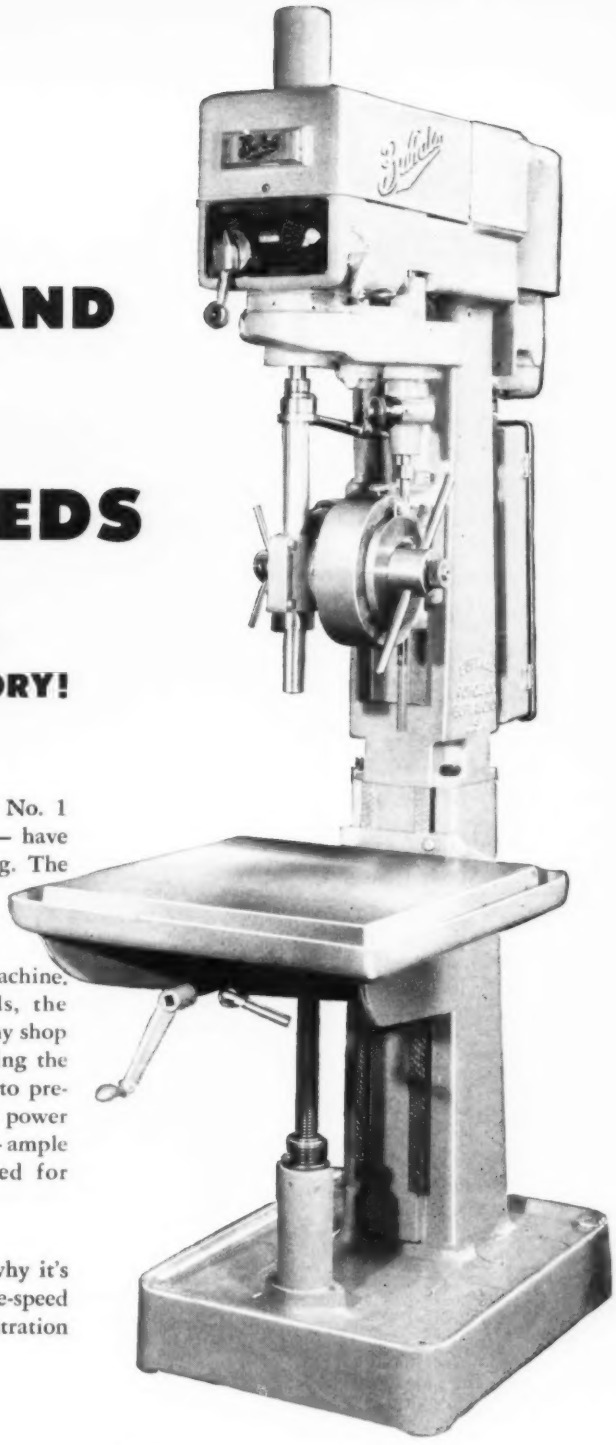
IN THE OPERATOR'S HAND -1001 DRILLING SPEEDS

— PLUS THE SMOOTHEST OPERATION IN DRILL HISTORY!



The gearless variable speed drive in the new No. 1 "RPMster" — plus "Buffalo" craftsmanship — have brought a new smoothness and ease to drilling. The shift handle at left places the drive in high or low range, while the dial at right provides infinite variations in either range. They're easily reached, as are all controls on this 88"-high machine. Made in one-to-six spindle pedestal models, the "RPMster" has long-life and accuracy features any shop man will appreciate — all moving parts including the precision spindle machined *after* heat treating to prevent warpage — hand scraped ways — "Buffalo" power feed — strong, rigid, stable base and frame — ample work tables — all parts carefully hand-fitted for permanent accuracy.

But you have to operate an "RPMster" to see why it's literally the finest value in vibration-free, variable-speed drilling available. Write for details on a demonstration at your "Buffalo" machine tool dealer's.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

BUFFALO FORGE COMPANY

492 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

Collectors Control Airborne Dust

Dust can be a major problem. It wastes materials, harms workers and equipment.

As mechanized raw materials handling systems grow, so do dust worries. Machining, grinding, other operations produce it.

It can be tamed, though.

▪ Many firms find dust control units useful, if not absolutely necessary, in their plants. If left unchecked, even in a small shop, dust can play havoc with employees' health, and the condition of equipment.

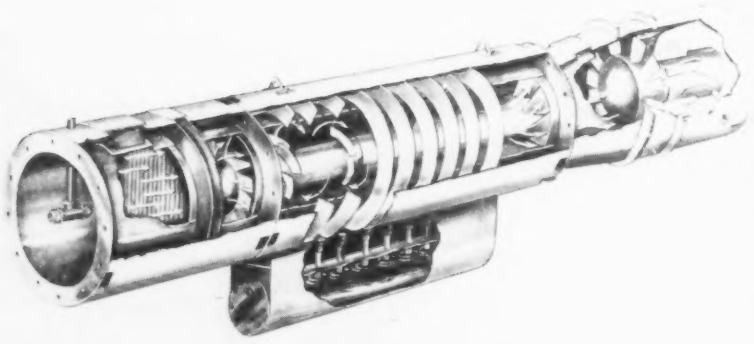
Installing a sufficient airborne-dust control system often pays for itself. It can reduce maintenance and cleaning costs and keep harmful, abrasive dust out of machines. And it certainly makes the task of workers a little more pleasant.

Grinding Dust Down—At Allegheny Ludlum Steel Corp.'s Brackenridge plant, a newly installed collection set up gets rid of dust from grinding operations. Recently set-up to eliminate surface imperfections on stainless steel slabs are seven hydraulic-electric grinders. These kick up a considerable bit of fine metallic and abrasive material which would fly all over the plant, settling on men, floors and machines, unless arrested.

Practically all of the airborne particles, though, never reach the ground. Four 48,000-gpm capacity dust collectors near the grinders see to this.

Sparks Into Hood—Each grinder faces a booth into which sparks and fine dust are sprayed. All floating dust is pulled into a hood and connecting duct work immediately above each booth.

The collectors, produced by Joy Mfg. Co., Pittsburgh, were the largest available from the manufacturer.



KEEPS AIR CLEAN: Into this unit goes contaminated air. Water spray and fan devices get rid of unwanted dust.

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Electrolimit
JIG BORER

- INCREASES ACCURACY
- HELPS ELIMINATE COSTLY ERRORS
- IMPROVES WORK QUALITY

And
- REDUCES PRODUCTION COSTS IN THE TOOLROOM *AND ON THE PRODUCTION LINE!*

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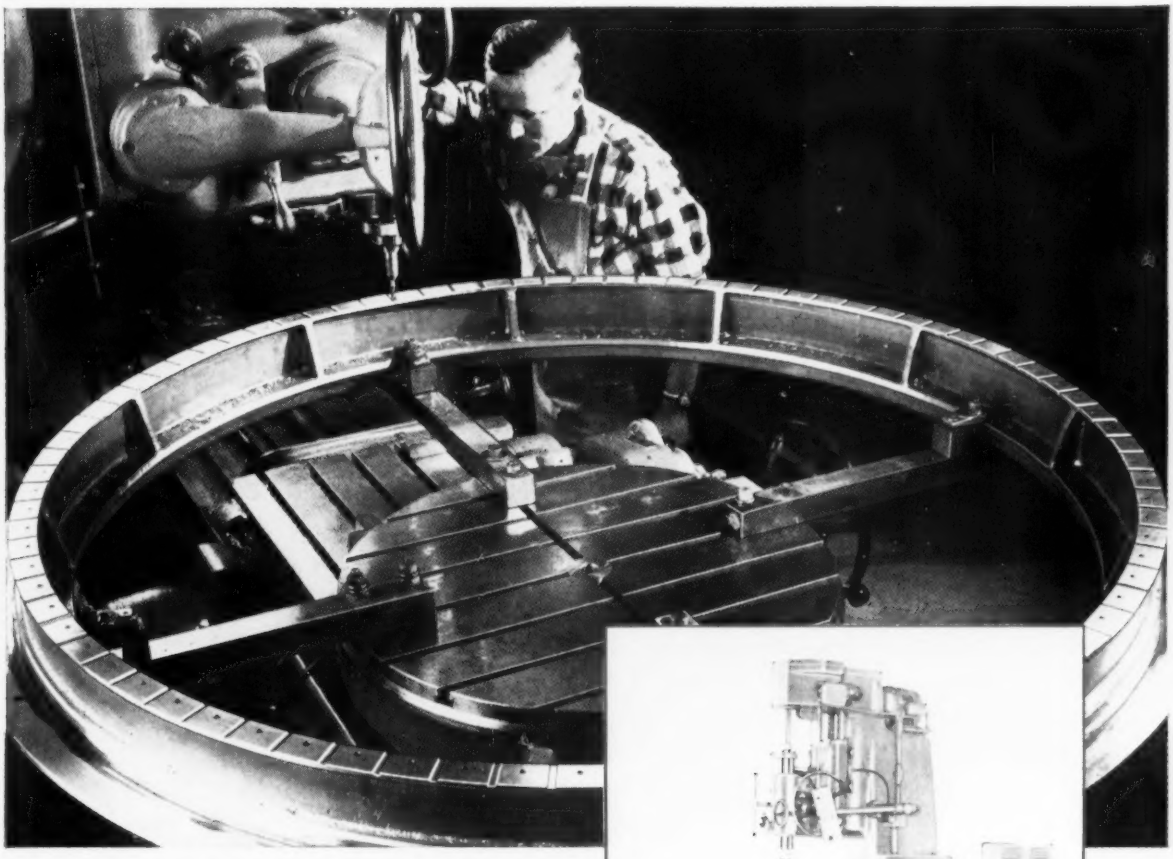
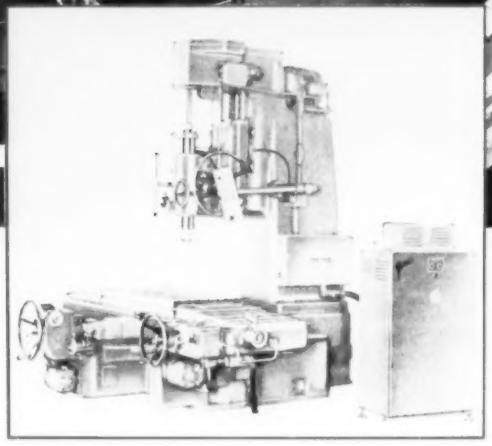




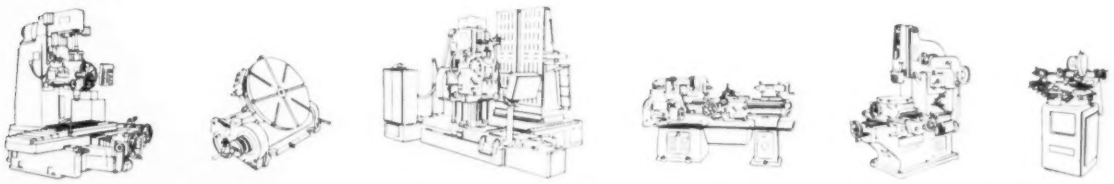
PRECISION plus BIG CAPACITY

P&W JIG BORERS WITH OPEN-SIDE CONSTRUCTION

Nearly 6 feet in diameter, the aircraft tooling fixture shown above was really big! It required machining 84 slots and boring 84 holes on the face and machining 84 slots on the flange. *All* 252 slots and holes had to be equally spaced and located within ± .001" of true radial. Handling jobs like this with ease and efficiency takes the combination of high precision and big work capacity you'll find only in a Pratt & Whitney Jig Borer with Open-Side Construction.

Pratt & Whitney Jig Borers – both Electrolimit and End-Measure types – are produced in complete lines for every work size requirement. All types and models will locate accurate to .0001" . . . and will retain this initial high precision and rigidity *indefinitely!* Get complete information now.

Write for your copy of Circular No. 587. Pratt & Whitney Company, Incorporated, 10 Charter Oak Boulevard, West Hartford 1, Connecticut.



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for continuous carbonitriding, carbon correction and scale-free hardening of small parts

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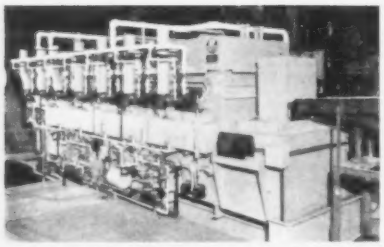
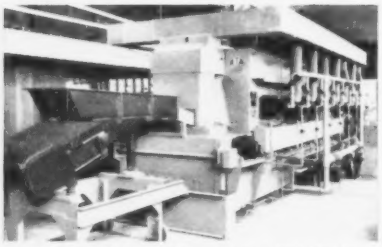


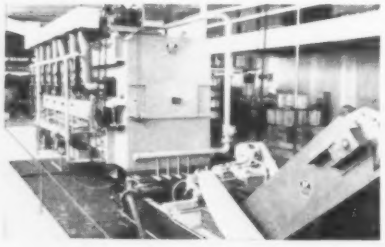
Carbonitriding, Carbon Correction, Carburizing, Scale-free Hardening and other Processes are Handled Uniformly, Economically and Continuously in EF Chain Belt Conveyor Furnaces.



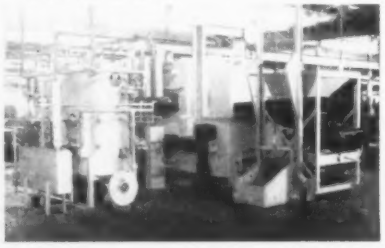
EF Gas Fired Radiant Tube Combination Hardening and Dry Cyaniding Unit Fitted with an Automatic Feeder that Distributes the Parts Evenly on the Chain Belt Conveyor; and a Dual Quench.

The EF chain belt conveyor furnace is one of the most satisfactory continuous heating units yet devised for scale-free hardening, carbon restoration, carbonitriding, carburizing and non-decarb heat treating small and medium size parts. The material is loaded onto our rugged heat resisting cast link conveyor belt; carried through the furnace; heated uniformly to proper temperature; automatically quenched and discharged. No pans or trays are needed. Hundreds in daily operation prove the dependability and efficiency of our design. 11 standard sizes. Capacities to 2000 lbs. or more per hour. Gas, oil or electrically heated. Furnished complete with any desired feeding, discharging or special atmosphere equipment. Write for folders describing our chain belt conveyor type and other production furnaces.

The Conveyorized Partitioned Dual Quench Moves Laterally to Permit either the Complete Oil or the Water Quenching Equipment to be Positioned under the Sealed Furnace Discharge.



This EF Special Atmosphere Unit can Operate as either an Exothermic or Endothermic Generator. Used with EF Continuous Belt Hardening Furnaces for Scale-free Hardening or Carbon Restoration.



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ASK FOR BULLETIN 462-CB.

shows typical installations of EF Gas-fired, Oil-fired and Electric Furnaces.

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Unlike some similar systems, the four units are not installed one for each machine. They connect directly into the duct work over the grinders. With four collectors handling dust of seven machines, the firm realized space and installation savings.

Maintenance is practically nil for the units, say its users. Construction of type 316 stainless helps here. This material withstands corrosion and erosion of the grinding wheel abrasive particles and high alloy steel dust mixed with water.

Forms, Welds Motor Parts In Seconds

Thanks to a new joining-fabricating method, an electric motor producer is turning out its products at a rapid pace. The new technique is based on a machine which combines the use of both hydraulic and electrical systems; it forms and welds stator core wrappers for fractional horsepower motors in 36 seconds.

Designed and built by Standard-Modern Tool Co., Ltd., Toronto, the machine uses mechanized Sigma welding to reduce this formerly time-consuming process from a matter of minutes to seconds. Previously, the wrappers were preformed in a hand operated rolling machine. Then they were clamped and manually welded in approximately double the time now necessary.

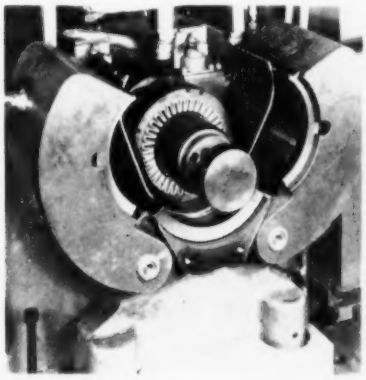
Offers Assets—Advantages of the argon-shielded method make this electric welding process particularly suitable for this job. It enables the company to maintain reasonable tolerance in material thick-

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 141. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

ness and joint fitup. It makes possible high welding speeds, and produces uniform welds which need no cleaning.

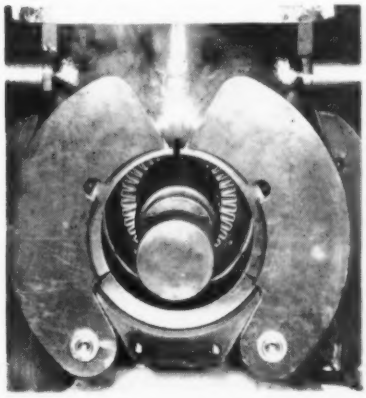
In production, a stator, complete with windings, insulation, and connection lugs, is placed in position on a mandrel before the machine



Rams push jaws together to form wrapper for stator core . . .

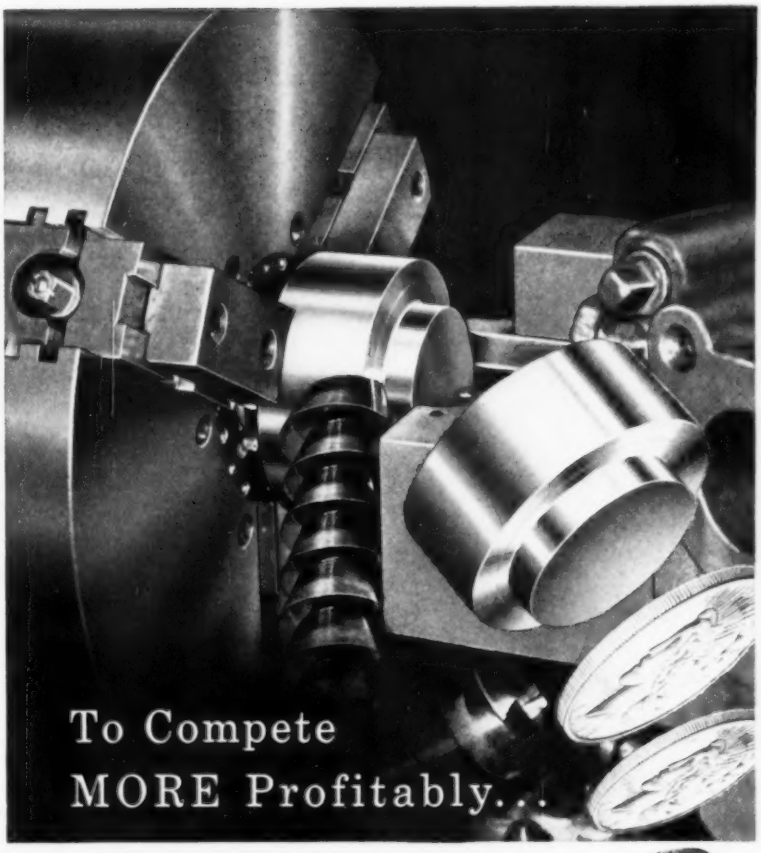
operation. Then, a wrapper sheet, preformed by a special shearing-forming die in a conventional press, is positioned at a stop on the forming jaws.

How It Works—After a start button is pushed, the bottom die rises against the underside of the wrapper. By means of a rack and pinion, the upward movement of



. . . Then the welder goes into action to join the wrapper.

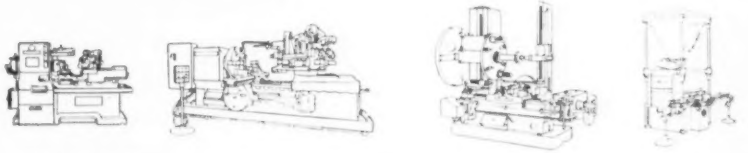
the lower jaw swings the two side jaws approximately halfway to their final position, aligning two hardened socket-type inserts in the jaws with side rams. Hydraulic cylinders operate the rams, forcing the jaws together.



You MUST cut costs

Designed and built to hog out tough metals faster and to hold required tolerances while increasing output rates, Potter & Johnston Automatic Turret Lathes are your best bet for cutting production costs and gaining an effective advantage over competition.

You can't reduce wage scales, material costs, power rates or taxes . . . but you *can* investigate Potter & Johnston Automatics now. Teamed with time-saving P&J-Engineered Tooling, these machines have everything it takes to increase production, improve work quality, shorten machining time, and reduce costs by providing divided labor charges. Write today for complete information . . . there's a P&J Automatic for every work size requirement. Potter & Johnston Company, Pawtucket, Rhode Island.



AUTOMATIC TURRET LATHES . . . GEAR CUTTERS . . . GILDA PACKAGING MACHINES

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PRECISION PRODUCTION TOOLING SINCE 1898

29 BURT FREE FLOW FAN VENTILATORS DO DOUBLE DUTY ON THIS STEEL PLANT

In this large steel plant, huge volumes of fumes and heated air must be exhausted during certain operations —lesser amounts during other production. Twenty-nine 72" Burt Free Flow Fan Ventilators with individual capacities of 81,000 CFM meet *both* needs efficiently. Burt Axial Flow cast aluminum fan wheels powered by 15 HP, 860 RPM Class B insulated motors, with shroud and ventilating tubes, supply adequate air movement at peaks. At other times, their high wind band design provides extremely high air handling capacity as a gravity unit without the fan operating. If YOU need fresh air at low cost, let Burt engineers suggest—without obligation —the Burt Ventilators to do your task best.

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MEMBER POWER FAN MANUFACTURERS ASSOCIATION

TECHNICAL BRIEFS

When the jaws have closed, the welding outfit, produced by Linde Co., New York, starts automatically and continues welding to the end of the seam. Upon completion of the single pass weld, the welding head returns to the starting position and shuts off automatically. Simultaneously, all three jaws drop away. The completed assembly is then hydraulically ejected from the mandrel.

A 1/32-in. gap between the ends of the wrapper is desired to obtain a well-penetrated, smooth weld without undue reinforcement. The weld starts and finishes a short distance from the edges of the wrapper because the assembly is machined to receive end plates in a later operation, after which no unwelded sections remain.

Improves Shell Mold Testing Method

Army researchers report an improved foundry control method for tensile and transverse bend testing of shell molds and core sands.

The research which brought about the new techniques was aimed at identifying and correcting the erratic behavior of sand specimens during testing. Analysis of the tensile specimen and procedure indicated that the inconsistent values yielded by conventional test briquettes for shell molds and sand cores are caused largely by stress concentration resulting from the specimen's geometry.

Cuts Stress Concentration—As a result of the study, Army scientists developed a new design for tensile test briquettes. This design minimizes the concentration of stresses at the critical testing zone. A higher apparent tensile strength was demonstrated for all sands tested. Not only this, but reproducibility was improved for rammed resin and oil-bonded sands.

A report, "Improvement of Sand Testing Techniques for Shell Mold

and Core Sands," describes the new idea. It's available from the Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. It contains 35 pages, costs $1.00 per copy and is numbered PB 121412.

Moves Oxygen Cutter Where The Work Is

Having an oxygen cutting unit where you want it, when you want it has its advantages. Besides the convenience involved, there's the production angle.

Diamond T Motor Car Co., Chicago, uses such a mobile setup to produce more truck parts and eliminate costly machining and sawing. By mounting a Linde oxygen-cutting machine on a portable table, the truck maker now produces short runs of more than 100 different parts. Previously, many of these parts were purchased. At the same time, manual oxygen-cutting operations have been reduced.

Moves Around Plant—The table was designed by the company's fabricating department to make mechanized oxygen-cutting available for any location in the plant.

Operator lifts legs prior to moving the portable setup.

It is 6-ft long and 3-ft wide, and has a special platform for oxygen and acetylene cylinders. Two ball-bearing trailer wheels are at one end, and a special pin at the other.

An operator, using a two wheel pick-up that engages the pin, can lift and easily move the table.

Higher Basic Standards of Accuracy

A NEW APPROACH TO LOWER-COST PRODUCTION

The product you manufacture may – or may not – require fine precision, in itself. In either case, higher basic standards of accuracy will make it possible for you to reduce production costs and speed up output. Precision standards will help you maintain the *correct* tolerances – broad or close – for your product, clearly define these tolerances for your operators, and insure work always within correct limits with minimum scrap losses. Accurate measurement will insure faster, lower-cost assembly and often eliminates expensive selective assembly.

The right means for establishing higher basic standards of accuracy in your plant may be just a set of precision gage blocks . . . or a fully-equipped "Standards Room." But whatever your needs, you can be sure of the finest when you select from Pratt & Whitney's complete line of Basic Measuring Equipment.

Write for complete information
Pratt & Whitney Company, Incorporated
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GAGE BLOCKS . . . STANDARD MEASURING MACHINES . . . SUPERMICROMETERS . . . COMPARATORS
CONVENTIONAL GAGES . . . THREAD COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

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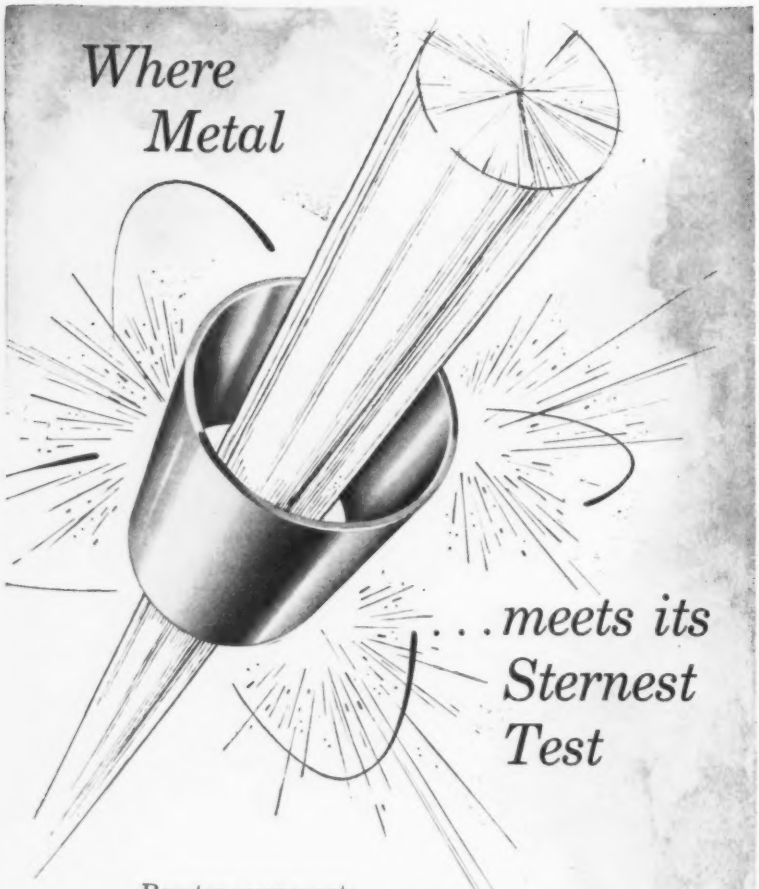

Reactor components, operating submerged in high-temperature and high-pressure radioactive water, are sealed in protective "cans" of *stainless steel.* Pile control rods, exposed to the same conditions, are clad with sleeves of *stainless steel* and are suspended by cables of *stainless steel.*

In any field – nucleonic, aviation, guided missile – where critical specifications *must* be met, Wallingford Steel can fill the need with stainless and super metal strip or tubing of extremely high quality, excellent corrosion resistance and low heat transfer rates.

Whether your need is quality stainless steel, or super metals with special characteristics, Wallingford Steel can help you. Write today.

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for over 35 Years

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COLD ROLLED STRIP: *Super Metals, Stainless, Alloy*

WELDED TUBES AND PIPE: *Super Metals, Stainless*

TECHNICAL BRIEFS

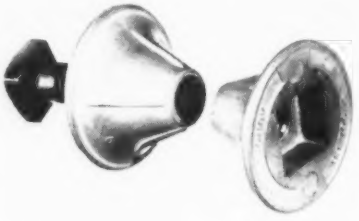
Linde's Oxweld CM-45 cutting machine with C-39 blow-pipe, rides on 6 ft of track supported 12 in. above the table top. The track assembly is positioned on the table top by means of skids on each end. These skids ride on guide rails.

This arrangement permits quick and accurate repositioning of the line of cut by a simple movement of the track. This avoids need to reposition the work.

Unique Fasteners Use Zinc Pads

Specially designed zinc die cast pressure pads are now holding together the large wooden spools used to store wire.

Manufactured by Paragon Die Casting Co., Chicago, for Howsam Spool Co., Aurora, Ill., the new zinc pressure pads are made so that one part of the fastener is placed under the head of the bolt to replace the cup washer. Result: pressure is applied against the end grain of the wood. This causes the pad to hold



This zinc diecast pressure pad holds together large spools.

tight regardless of the changes in the wood itself caused by moisture or dryness in storage areas.

The new die cast pressure pads cannot work loose.

And More, Too—In addition, this fastener is especially shaped to lock against the wooden spool and prevent turning. Once tightened by a square headed wrench, the indented pad head secures the bolt to restrict movement.

The pad is of No.-3 zinc alloy cast in an eight cavity die which makes four castings of each part at the same time. Other uses for the new fastener are now being investigated.

Magnetic Particle Test Checks Welds

Small surface cracks in finished welds on heavy ship plates are difficult to detect with X-rays. For this reason, engineers at the Brooklyn Navy Yard use magnetic particle inspection techniques to supplement radiography procedures.

To check minute longitudinal defects, Navy technicians use a Portaflux unit. A rubber squeeze bottle is employed to spread a special metal powder. This powder indicates irregularities in the magnetic field when cracks are present. Prods are shifted 45° and the test is repeated for transverse flaws.

Here, two technicians check a weld for minute defects.

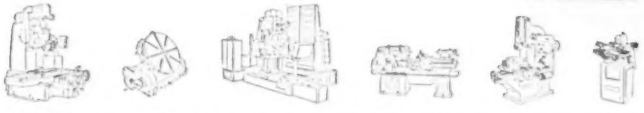
Magnetic Instrument—Facilitating the job is a device designed for use with the magnetic particle test unit. It consists of a magnetic cross in a non-magnetic housing and it indicates flux direction. This assures the operator that magnetization is sufficient to indicate defects.

The instrument was purchased from Philips Electronics, Inc., Mt. Vernon, N. Y. It weighs only 45 lb, is readily portable. The unit takes power from a standard 115-v electric system outlet.

Numerical Control

A NEW APPROACH TO PRECISION IN PRODUCTION MANUFACTURING – "Numerical Control" is an automatic, ultra-precision means of translating blueprint data into machine positions and, other functions. Successfully applied to Pratt & Whitney high precision Jig Borers, Hole Grinders and Rotary Tables which are usually restricted to toolroom use, Numerical Control makes the superior accuracy of this equipment available for efficient long run or short run production work where extreme precision is essential. It provides automatic operation *without* complex, expensive tooling or investment in special "one-job" machines. Scrap losses due to human error are practically eliminated since the machine can be placed under the control of a tape program.

Write for more information.
Pratt & Whitney Company, Incorporated,
10 Charter Oak Blvd., West Hartford, Conn.



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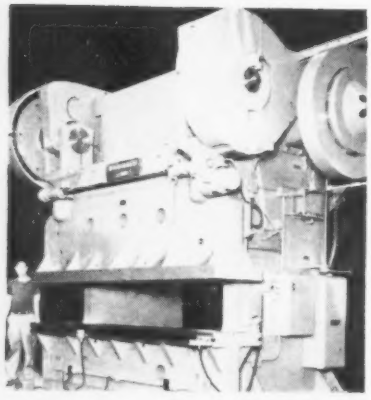
PRATT & WHITNEY
FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

New Production Ideas

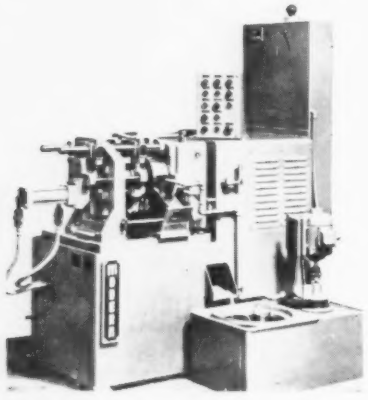
Equipment, Methods and Services



Press Brake Accommodates Heavy Punching Dies

This press brake features a dimension of 8 ft 6 in. between housings; it has an overall die surface of 12 ft. Both bed and ram of the unit are permanently widened to 28 in. This allows for mounting heavy corrugating and punching dies. Its stroke is 8 ft and it has a shut-height of 22 in. This machine is equipped with a power take-off from the main shaft for driving automatic feeding and withdrawal units. All-steel, interlocked construction assures the press brake of good stability. An air-electric system makes up the unit's clutch control. A two-speed, totally enclosed transmission permits the machine to operate at a normal production rate of 5 to 20 strokes per minute, according to its manufacturer. (The Cincinnati Shaper Co.)

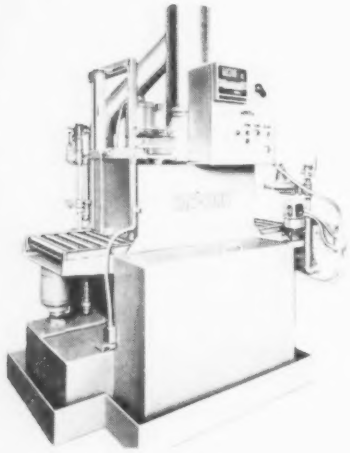
For more data circle No. 1 on postcard, p. 141



Two-station Unit Deburrs, Chamfers Gear Teeth

Featuring automation equipment, this two-station machine chamfers and deburrs gear teeth at both ends of a groove. It processes each part through the two work positions in a cycle time of six seconds at a 600 an hour rate. The unit removes sharp edges on the ends of the teeth and simultaneously gets rid of burrs resulting from the gear-cutting process. Although the automation equipment is custom tailored, the basic universal machine will handle spur gears, helical and straight-sided as well as involute-form splines from 5/8 to 6½-in. PD. The automation equipment works off only one air cylinder and four interlocked limit switches. For easy tool access, the automatic unit mounts on two guide bars. Loosening two screws is all that's necessary to move it out of the way. It's just that simple. (Modern Industrial Engineering Co.)

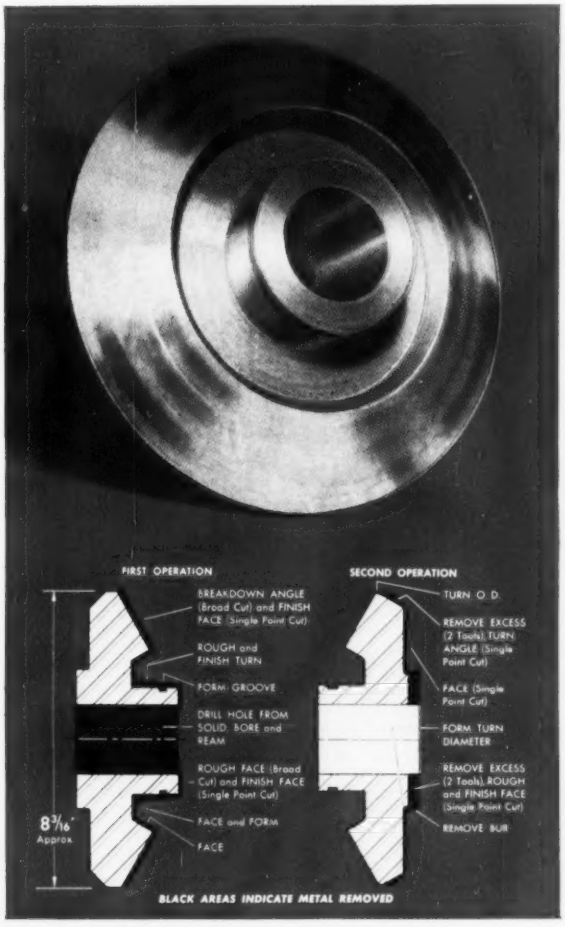
For more data circle No. 2 on postcard, p. 141



Washer Cleans Parts Between Machining Steps

Parts moving from one machining step to another are cleaned by this washer. It removes chips and cutting oils from the workpieces to assure accuracy of succeeding operations. Since the unit handles items in transit from one machining set-up to the next, it's actually an inter-process washer; yet, it is a single-stage unit. It works like this: Parts on a roller conveyor, on fixtures or in baskets, are loaded into the cabinet. Vertical sliding air operated doors at both ends of the cabinet are closed by manual operation of the control valve lever located at the loading end. When doors are closed, the pump is started and the parts are subjected to thorough spray action cleaning with a heated recirculating washing solution. After washing, the doors open and a valve in the solution line leading to the spray is closed. This automatically cuts off the spray. Then parts are removed. (Ransohoff, Inc.)

For more data circle No. 3 on postcard, p. 141


FIRST OPERATION
SECOND OPERATION
BREAKDOWN ANGLE (Broad Cut) and FINISH FACE (Single Point Cut)
ROUGH and FINISH TURN
FORM GROOVE
DRILL HOLE FROM SOLID, BORE and REAM
ROUGH FACE (Broad Cut) and FINISH FACE (Single Point Cut)
FACE and FORM
FACE
8 3/16" Approx.
TURN O.D.
REMOVE EXCESS (2 Tools), TURN ANGLE (Single Point Cut)
FACE (Single Point Cut)
FORM TURN DIAMETER
REMOVE EXCESS (2 Tools), ROUGH and FINISH FACE (Single Point Cut)
REMOVE BUR
BLACK AREAS INDICATE METAL REMOVED

Let me show you how one of our P & J Automatics

put this

"PROBLEM" Job on a PAYING BASIS!

Some of the toughest machining jobs you'll ever have to handle get that way, *not* because of any *single* factor like extra-hard metal or really heavy cutting, but because of *several* contributing factors that can add up to a lot of machining time and a big profit loss. The job shown here . . . which one of our customers brought in recently . . . is a good example. A glance at the "Job Facts" will show you a combination of factors that could easily have made this job a real problem. The most difficult of these requirements was machining the bevels . . . which had to meet close tolerances for size and conformity to the true angle and, in addition, demanded a fine finish with *no* tool-return marks permitted. However, handling this part on a Potter & Johnston 4-U Automatic, with a tooling set-up engineered by P&J Tooling Specialists, put this potential headache on a high-output, high-profit basis.

HERE ARE THE JOB FACTS:

PART: *Bevel Gear*

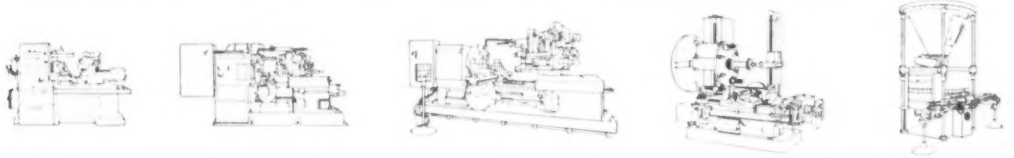
MATERIAL: *Steel Forging, 190 Brinell*

MACHINING REQUIRED: *22 separate roughing and finishing cuts including several hard-to-handle angle cuts.*

SPECIAL REQUIREMENTS: *Hold bevel angles to close tolerances and produce a good finish.*

RESULTS: *A part finished every 13 minutes floor-to-floor time . . . on a P&J 4-U Automatic!*

A new P&J Automatic can put *your* problem jobs on a paying basis too! Send me your sample prints and I'll show you how a P&J Automatic with P&J Tooling can help you turn out your toughest jobs faster, better and at lower cost. Write Potter & Johnston Company, Pawtucket, Rhode Island.



AUTOMATIC TURRET LATHES . . . GEAR CUTTERS . . . GILDA PACKAGING MACHINES

POTTER & JOHNSTON

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INC.

PRECISION PRODUCTION TOOLING SINCE 1898

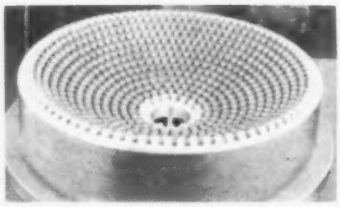
KUTZTOWN *Skill*

CREATES A FORMING DIE

. . . designed to water - quench steel heads

Cast to size to avoid machining

WT. - 5600 lbs.



This 64-inch diameter casting was dry sand molded, using High Tensile Iron. The alloying and processing of High Tensile Iron requires a specialized knowledge. Kutztown perfected this process in 1936. We invite inquiries from industrial engineers who wish to investigate the possibilities of applying this high strength metal to overcome wear or stress problems in their equipment planning. We can be helpful in guiding your engineers in their planning and assist them in the development of superior equipment through the use of Kutztown High Tensile Iron!

We'll be happy to place your name on our mailing list to receive regular issues of the "Kutztown REVIEW".

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• LO-ALLOY IRON • DUCTILE IRON

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KUTZTOWN, PENNSYLVANIA

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LOAD CAPACITY
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Foundries, steel mills, power plants—all acclaim this Hayward Electric Clam-Shell as the finest hook-on bucket obtainable. Handles extra large loads safely. Notable for giving many years' service with minimum maintenance. Interchangeable with your electric magnet. The Hayward Company, 50 Church St., New York 7, N. Y.

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SCREW

Faster and tighter wrenching in counterbored hole applications result when you use this new externally wrenched screw. Any socket wrench handle with standard 12-pt. socket may be used for assembly.

Samples, prices, complete information upon request. Write today—

THE FERRY CAP & SET SCREW CO.
2157 Scranton Road • Cleveland 13, Ohio

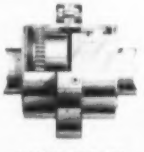
AJAX *Flexible* couplings

D100-12°

Ajax Series D-100 Dihedral Couplings handle shaft misalignment, — offset, angular and end float up to 12°. Patented tooth design permits far less tooth clearance and provides more tooth area in contact under misalignment than with any other shaped tooth. No end-of-tooth wear, even under maximum misalignment.

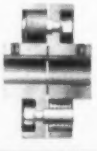
D3000-3°

Ajax Series D-3000 Dihedral Couplings handle shaft misalignment up to 3°, — yet cost no more than ordinary gear type couplings that have far less misalignment capacity. Specially designed gear teeth distribute load over center of teeth, point of greatest strength. Johns-Manville "Clipper" Seals keep lubricant in and foreign matter out.



RUBBER BRONZE BUSHED

Ajax Rubber-Bronze Bushed Couplings are built in a wide range of sizes and capacities with standard couplings made of forged steel or cast semi-steel. Flanges can be machined from aluminum, bronze and other metals, and can be chrome, cadmium or silver plated for protection from adverse atmospheric conditions.



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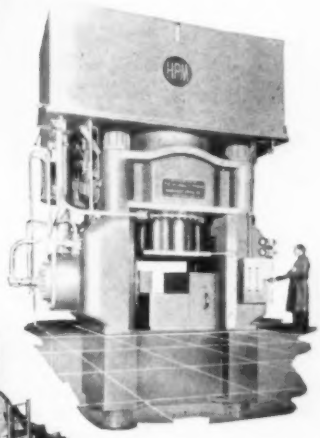
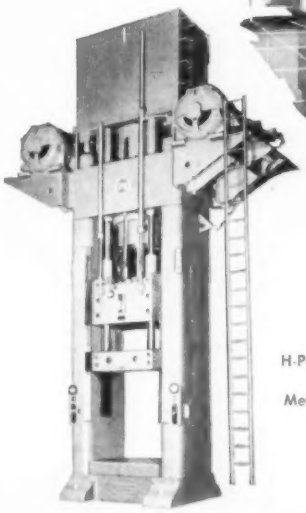
AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

HPM

80 YEARS BUILDING A TRADITION



H-P-M Metalworking Titanium Briquetting Press



H-P-M All-Hydraulic, Fastraverse Metalworking Press

Unlike many anniversaries that are built to exaggerated proportions, H-P-M is entering its eighty-first year with a minimum of interest in the past. Instead our research and development have geared our efforts to a program for the future. We like to feel that throughout our long and varied experience we have learned to anticipate the needs of the many industries with which we work. It is their future that guides our planning and our policies for the days ahead. This thinking has traditionally guided H-P-M to its present position as a leader in the hydraulic industry. Our goals will be changed only to provide more and better service to the industries we serve.

HPM

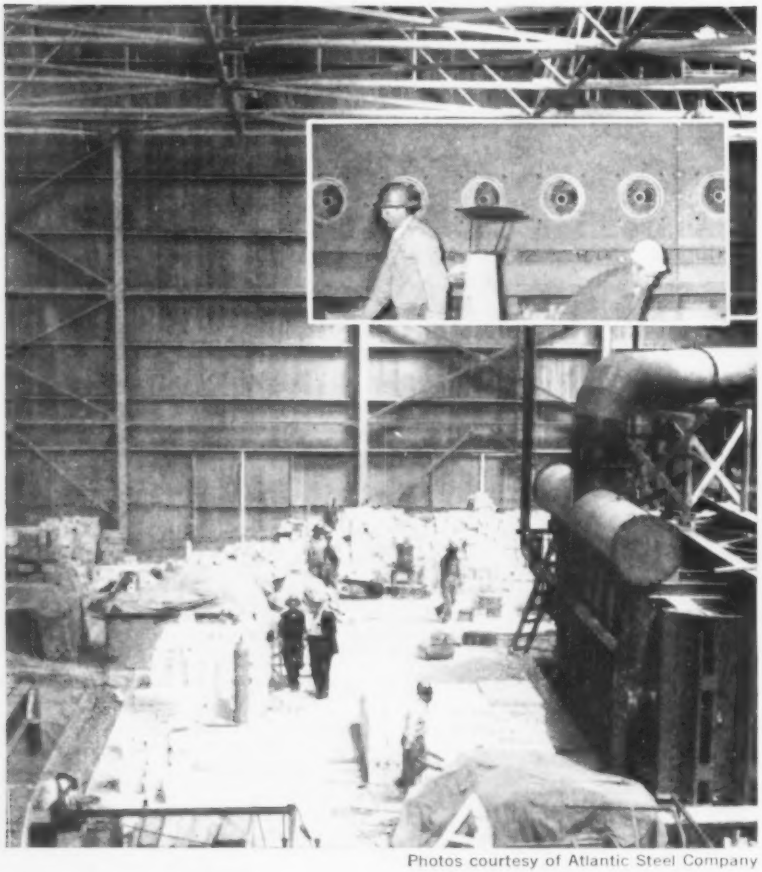
THE HYDRAULIC PRESS MFG. CO.

Mount Gilead, Ohio, U.S.A.

A DIVISION OF KOEHRING COMPANY

1877—1957

Profitable Trends in the use of Refractories



Photos courtesy of Atlantic Steel Company

New furnaces start right with Laclede-Christy Refractories

Specifications on Atlantic Steel Company's new 13" Bar and Rod Mill included a 90 ton per hour reheating furnace. They called on a leader in the field, Rust Furnace Company, to build it. Rust's experience and knowledge prompted their use of Laclede-Christy refractories.

The installation included Spallac super-duty fire brick which has proved its long-lasting qualities in other installations . . . requiring minimum maintenance and reducing downtime. Spallac super-duty features high refractory value, good volume stability, and high resistance to spalling. Also included was Laclede King high duty brick.

To start your furnace right—for new or replacement installations, it pays to use Laclede refractories. Call Laclede-Christy Works, Refractories Division, H. K. Porter Company, Inc., St. Louis 10, Mo.

HKP LACLEDE-CHRISTY WORKS REFRACTORIES DIVISION H. K. PORTER COMPANY, INC.

NEW EQUIPMENT

Drive Handle

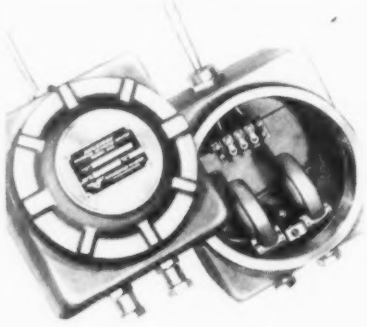
This ¼-in. drive handle spins-down nuts on assembly lines. It has a special button on top of the handle, which floating independently of the handle, allows its user to simply "spin" out or in nuts or

bolts. This button also acts as a palm saver. The tool is powered by a cross bar which acts as a fly wheel. This cross bar also acts as a leverage point to either loosen or tighten nuts or bolts. (Hunter Tools.)

For more data circle No. 4 on postcard, p. 141

Pressure Switch

This differential pressure switch is for use in explosive atmospheres. It senses a pressure difference be-



tween two variable pressures or a variable and a reference pressure. Available in four classes of proof pressures from 500 to 12,000-psi, it permits opening or closing of a

IN INLAND STEEL'S ROLL DEPARTMENT

New Mack-Hemp electronic contouring lathe removes metal at peak rates with .001″ accuracy

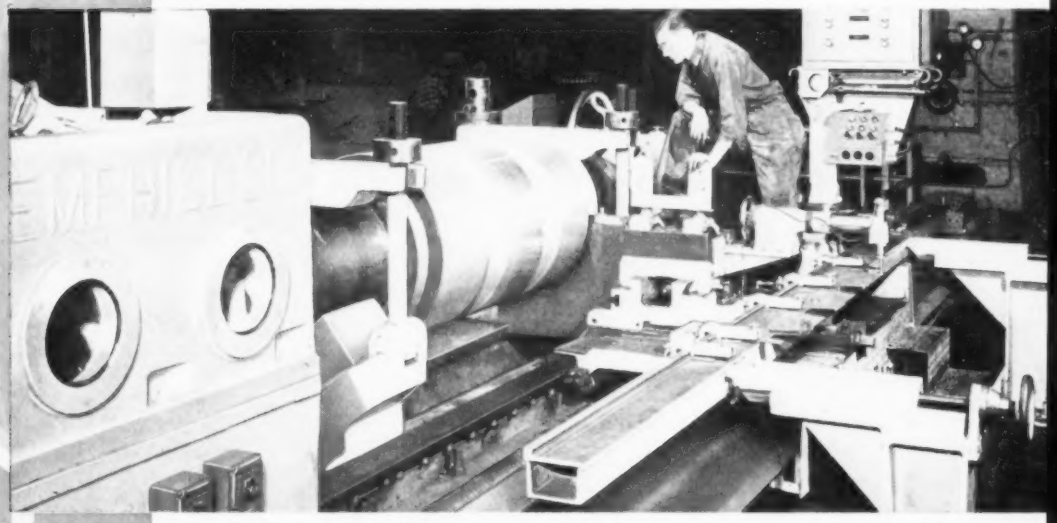
An electronic "pilot" guides this 48″ Mackintosh-Hemphill contouring lathe recently installed in the Roll Department at Inland Steel Company's Indiana Harbor Works. It is so precise that the lathe can finish contours into a roll without deviating more than .001″ from the pattern on the full-size template.

Stylus contact with the template controls the lathe's longitudinal- and cross-feed motors through electronic linkages. Thus, dual feed motion response of the tool holder carriage is instantaneous and smoothly continuous. Any conventional groove shape can be duplicated—it is even possible to make an accurate cut on a shoulder vertical to the axis of the roll.

But this precision of control is only one reason why the big lathe can turn shape rolls so rapidly. It has been designed and built to handle some of the heaviest torsional loads ever imposed on a lathe. For example:

It can operate continuously through a ⅞″ cut depth with feeds between .060″ and .100″, and with spindle speeds up to 62 RPM. It can turn rolls or forgings 50″ in diameter and 18 feet long.

If you are planning to install new large-roll turning capacity, you'll be wise to investigate these cost-cutting automatic contouring lathes. Write us today for complete information. They're available in 48″, 60″ and 72″ sizes.



Inland's new 48″ Mack-Hemp automatic lathe here is cutting passes into a new roll for a 3-high structural mill that rolls 15″ I-beams. Hardness of the roll is 42 Shore.

MACKINTOSH-HEMPHILL
DIVISION OF
E. W. BLISS COMPANY

Makers of the rolls with the Striped Red Wabblers

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cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings
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Especially Designed for . . .

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. . . Designed for clam shell bucket or magnet feed. Large capacities: 25 to 50 tons per hour.

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circuit on increasing or decreasing pressure difference from 15 to 10,000-psi at any point within the adjustible range of the model selected. Two parallel bourdon tube sensing elements provide repetitive accuracy for the control of delicate processes or the protection of sensitive instruments and equipment. The model operates in any position, simplifying installation and aiding portable installations. No balancing or levelling is necessary with it. (Barksdale Valves).

For more data circle No. 5 on postcard, p.141

Ball Bearing Chucks

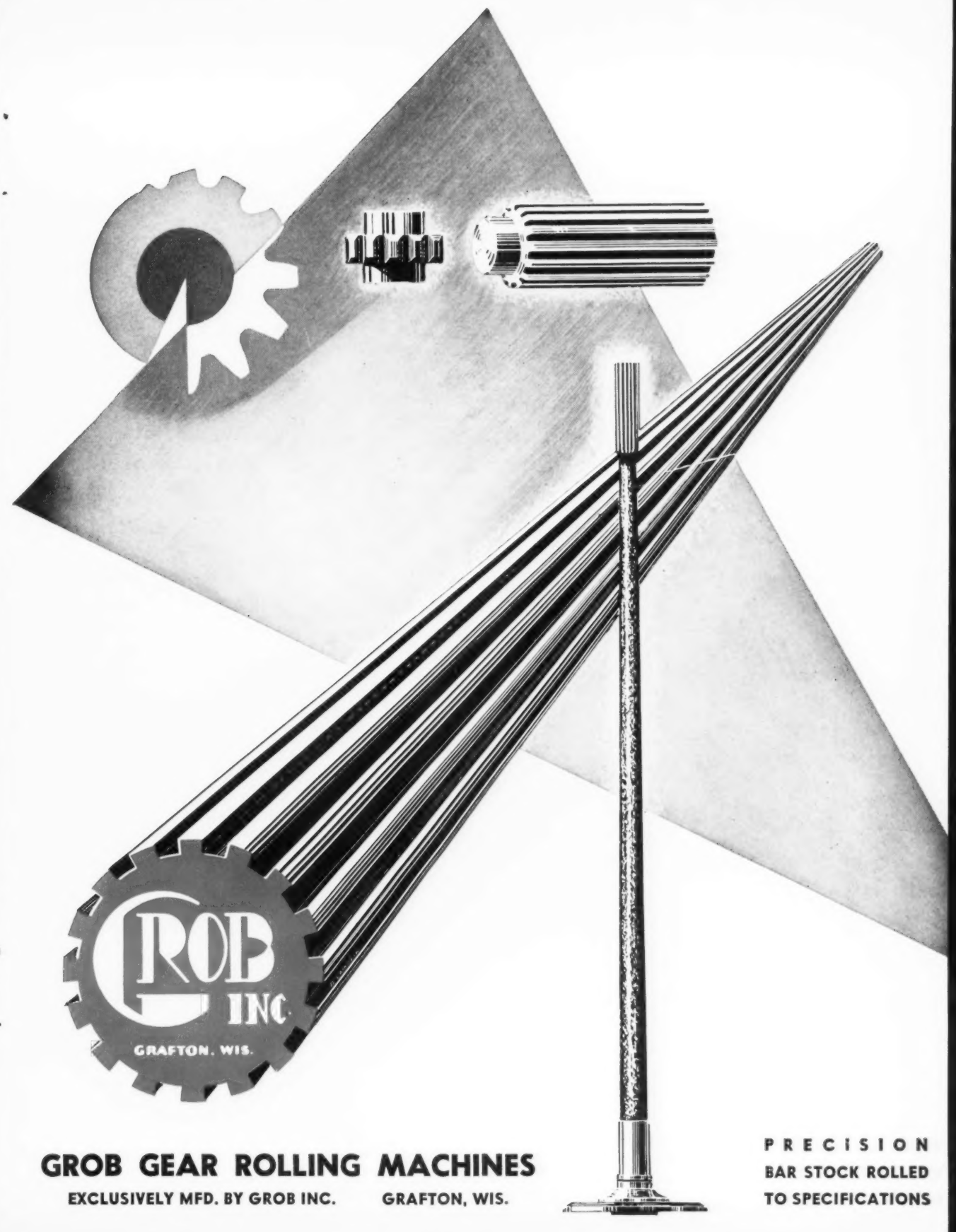
Extra gripping force is claimed for a line of ball bearing geared chucks. These chucks have a friction free ball thrust bearing between the chuck body and the

gear-nut. In accord with the models' regular one piece construction, the ball races are formed directly in the hardened chuck body and in the one piece gear-nut. (Supreme Products Corp.)

For more data circle No. 6 on postcard, p. 141

Forging Press

This redesigned high speed forging press features a tonnage limitor which prevents accidental overloading. It achieves this by automatically reducing the air pressure on the clutch as the slide approaches the bottom of the stroke, and increasing it on the return. The brake utilizes a double rather than a single clam shell design. This increases the braking area and, along with a



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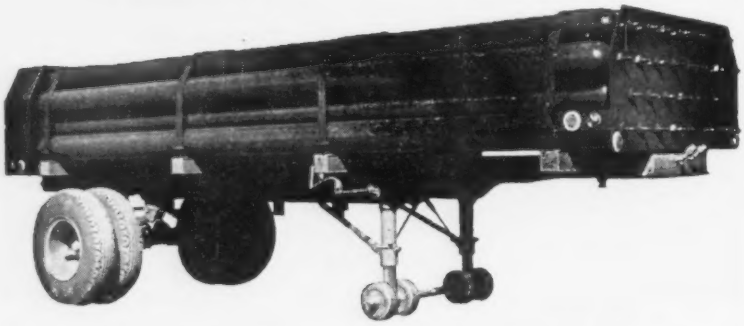
PRECISION
BAR STOCK ROLLED
TO SPECIFICATIONS

REDUCE CYLINDER HANDLING up to 50%

with INDEPENDENT *Gas Supply TRAILERS*

TRANSPORTING — Argon — Carbon Dioxide — Helium — Nitrogen — Oxygen — Boron Trifluroide — Hydrogen — Ethylene. Trailer capacities from 187,000 cu. in. to 750,000 cu. in. water capacity. Trailer tubes ICC3A-2400 Specifications with 2400 PSIG Working Pressure.



Sizes and weights to meet all State requirements.

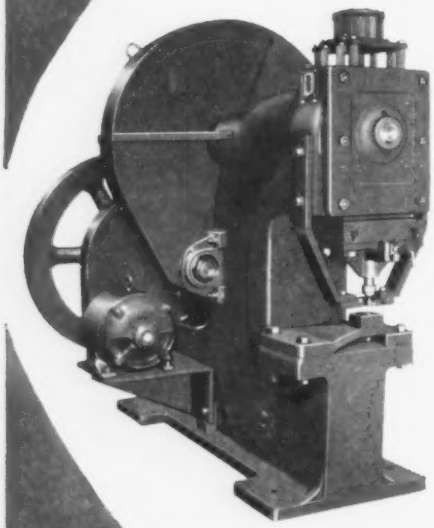
Can be mounted on bases for permanent storage.

INDEPENDENT ENGINEERING CO., INC.

CONSULTING RESEARCH DESIGNING

O'FALLON 4, ILLINOIS

it's the handiest punch in the fabricating shop



This 100-ton punch with architectural jaw is the "catch-all" machine for miscellaneous detail punching in many of the country's leading bridge shops. The usual quality features of Thomas construction are built into this machine:

- *Rugged construction*
- *Air counter balance of the cast steel ram*
- *Anti-friction bearings*
- *Cut steel gears*
- *Push-button clutch control*

Heavier models available

THOMAS

MACHINE MANUFACTURING COMPANY

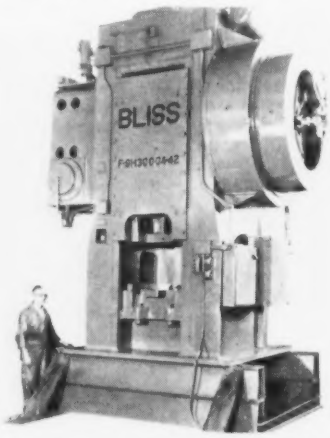
PITTSBURGH 23, PA.

Punches • Shears • Presses • Spacing Tables • Benders

S8

NEW EQUIPMENT

larger cylinder, doubles the braking effect. Other features include: air counterbalances instead of previously used "buffers"; air-actuated wedge-type die seat; redesigned fly-



wheel brake and new gear drive for both the limit switch and lubrication pump, replacing the earlier sprocket drive. (E. W. Bliss Co.)

For more data circle No. 7 on postcard, p. 141

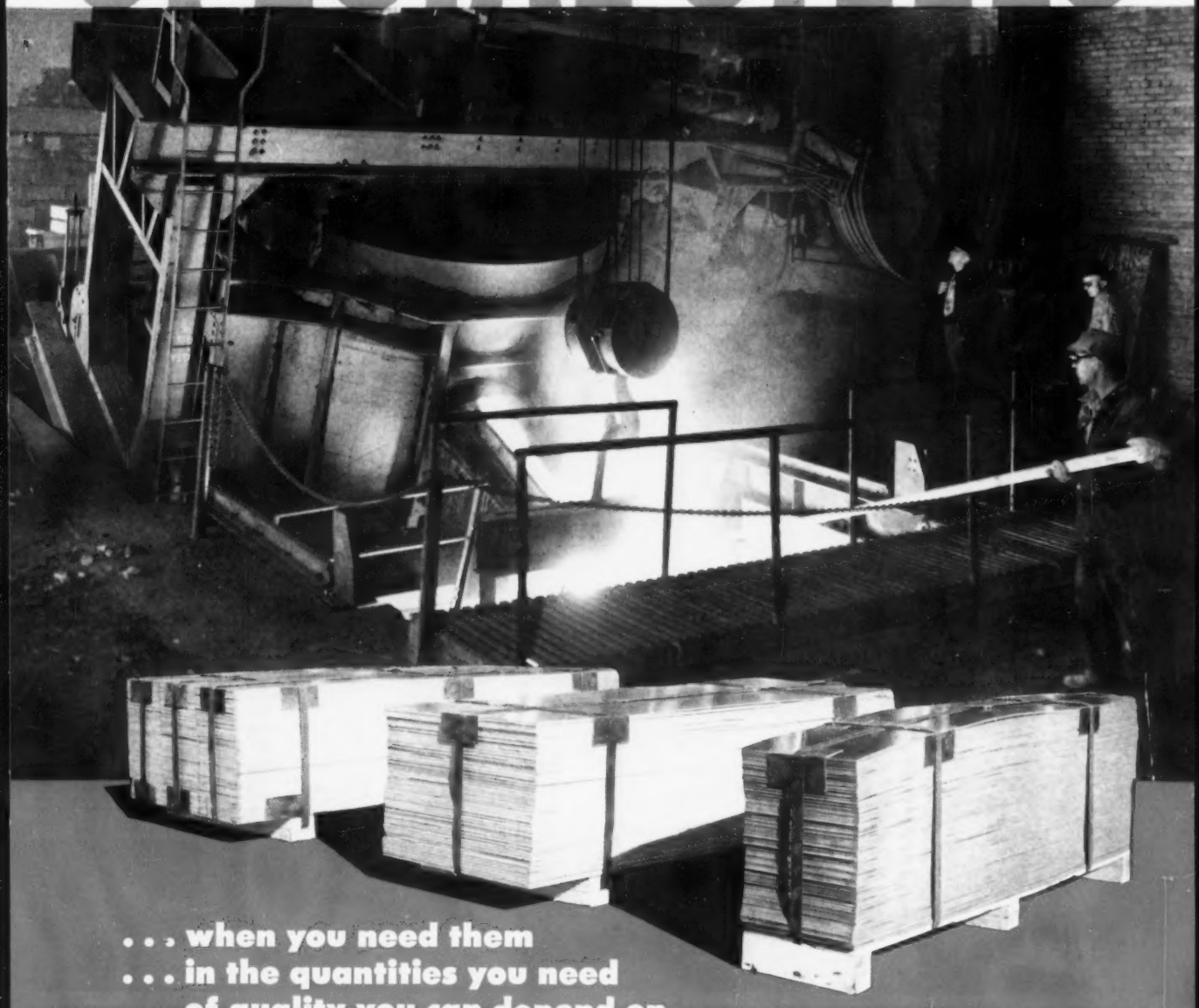
Dial Indicator

Highly sensitive, this finger-type dial indicator is rugged, easy-to-read, sensitive, and non-sticking. It has a clear vision dial graduated to 0.050 (the range of the indicator is 0.075). The indicator will read

either direction with no reversing lever or old-fashioned gear shifting. It is useful for height gaging or other work requiring repetitive indications. (M & G Instrument Co.)

For more data circle No. 8 on postcard, p. 141

SPECIAL STEELS*



. . . when you need them
. . . in the quantities you need
. . . of quality you can depend on

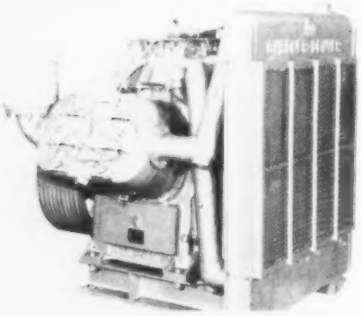
from centrally located Ingersoll Steel

When service counts, you can count on Ingersoll for a wide variety of special purpose steels.* Being a specialty mill, Ingersoll offers great flexibility in production scheduling, set up to fit your own requirements. Ingersoll's advantageous location at New Castle, Indiana assures prompt deliveries. And Ingersoll's modern quality-control facilities mean dependably uniform high quality from one order to the next. On all these counts, it will profit you to consult Ingersoll—a good name to know, a good place to go for the special steels you need.

* stainless steels • heat resisting steels • IngAclad stainless-clad sheets alloy steels • forging quality electric steel ingots • automotive clutch plate steels • Tem-Cross cross-rolled steel • carbon electric steel for tractor clutch discs • knife steels • saw steels • high speed hack saw steels • soft center and other agricultural steels • special analysis steels

INGERSOLL STEEL B-W BORG-WARNER

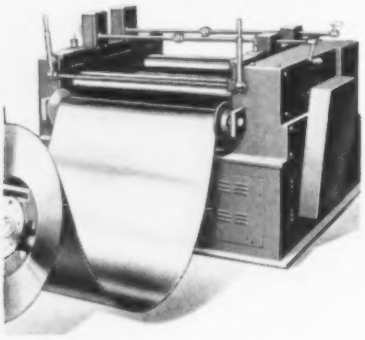
Ingersoll STEEL DIVISION
Borg-Warner Corporation
New Castle, Indiana



Air Compressor Takes Up Little Floor Space

Designed to save on floor space, this high-capacity air compressor fits into a 72 x 68-in. space. The new model is a 200-hp, two-stage package unit. Even though it occupies just 34 sq ft, the compressor sometimes does the work of two somewhat smaller units. This results in an even greater floor saving. The setup needs no special base. All it requires for operation is a bolting-down and a hook-up to a power source. Once installed, it operates on long, steady runs with little attention, its maker says. The compressor comes with a tube type intercooler or with a self-contained radiator-intercooler which saves on water. (Gardner-Denver Co.)

For more data circle No. 9 on postcard, p. 141



Coil Feeder Straightens, Measures Stock

Coil stock feeding is this setup's job. It feeds, straightens, measures and automatically cuts-off aluminum to accurate desired stock sizes. Employing a motorized coil reel with a loop control arm, a press feed straightening and measuring unit, and a high-speed shear, the machine is highly versatile. A control panel provides centralized regulation of all parts of the unit. Its operation begins with the coil on an expanding mandrel motorized payoff reel. A clutch and a loop control arm make sure that stock pays-out only when it's being used. Stock paying-off feeds into the press feed unit. (Dahlstrom Machine Works, Inc.)

For more data circle No. 10 on postcard, p. 141

KILLING THE DEEP-DRAW BUGABOO
Bert, we're in trouble—too many rejects. They're up to one in seven. We'd better find out what's wrong—fast.
Yes, Tony, our Whitemarsh Lab tells me your rejects can be cut 'way down with a Pennsalt dry lubricant—and it'll pay for itself in no time.
OK—we'll make a trial run Tuesday.
THE NEXT MONTH

Machines Vanes In Minutes, Instead Of Hours

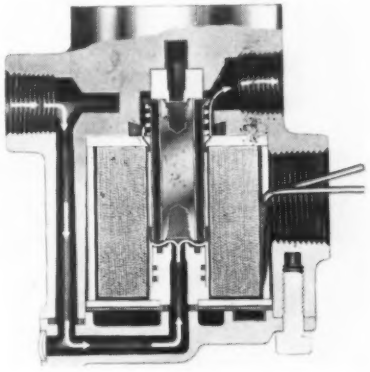
Labor costs go down when this vane making setup goes into use. So states its maker. It works such parts as jet engine compressor or blower blades. The unit automatically machines these difficult vane jobs rapidly, completely doing away with hand finishing. Some pieces, requiring up to 80 hours work previously, are finished in just ten minutes, according to the manufacturer. Just about any vane configuration can be accommodated on the unit. It works straight or tapered sides, concave or convex shapes, and constant or variable leads. Vanes can be generated 720°, and may be perpendicular either to the axis or hub. Hubs with either concave or convex contours can be machined. (Nationwide Engineering Service, Inc.)

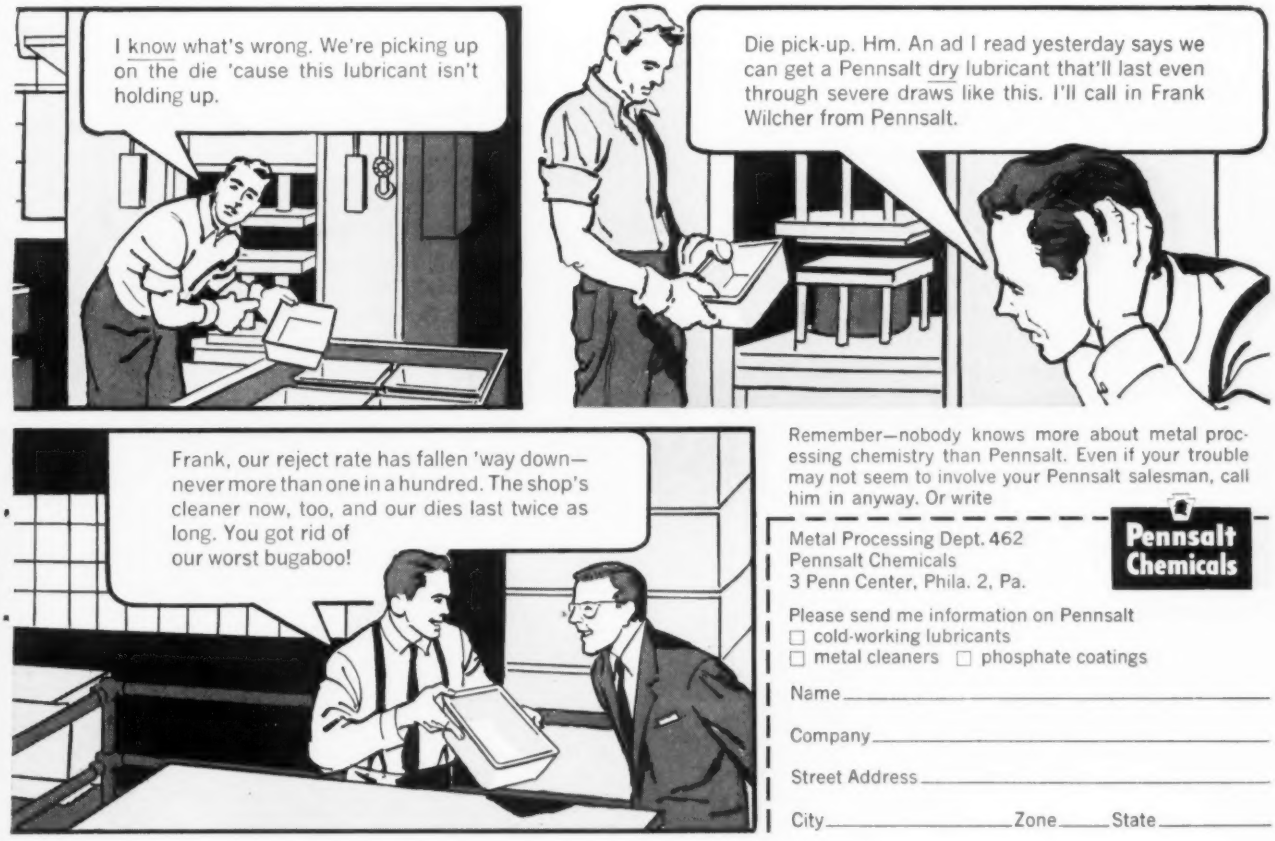
For more data circle No. 11 on postcard, p. 141

Solenoid Pilots Are Self-cleaning, Cooled

Continuous internal cooling of the solenoid coil and a self-cleaning effect of its actuating plunger prevent overheating of this solenoid pilot. Capable of handling air, vacuum, oil, water and inert gases, the unit features leak-free operation. The operating medium, carrying entrained lubricant, passes through the center of the solenoid, between the plunger tube and the plunger. This provides internal cooling and continuous plunger lubrication. Thus, there is free movement throughout the solenoid pilot's life. The coil is completely sealed from the operating medium by multiple seals. Encased in molded epoxy resin, the coil is guaranteed against burn-out for the life of the valve. Pilots can come in two and three way types for separate pilot control applications. (Valvair Corp.)

For more data circle No. 12 on postcard, p. 141




I know what's wrong. We're picking up on the die 'cause this lubricant isn't holding up.
Die pick-up. Hm. An ad I read yesterday says we can get a Pennsalt dry lubricant that'll last even through severe draws like this. I'll call in Frank Wilcher from Pennsalt.
Frank, our reject rate has fallen 'way down—never more than one in a hundred. The shop's cleaner now, too, and our dies last twice as long. You got rid of our worst bugaboo!

Remember—nobody knows more about metal processing chemistry than Pennsalt. Even if your trouble may not seem to involve your Pennsalt salesman, call him in anyway. Or write

Pennsalt Chemicals

Metal Processing Dept. 462
Pennsalt Chemicals
3 Penn Center, Phila. 2, Pa.

Please send me information on Pennsalt
☐ cold-working lubricants
☐ metal cleaners ☐ phosphate coatings

Name_____

Company_____

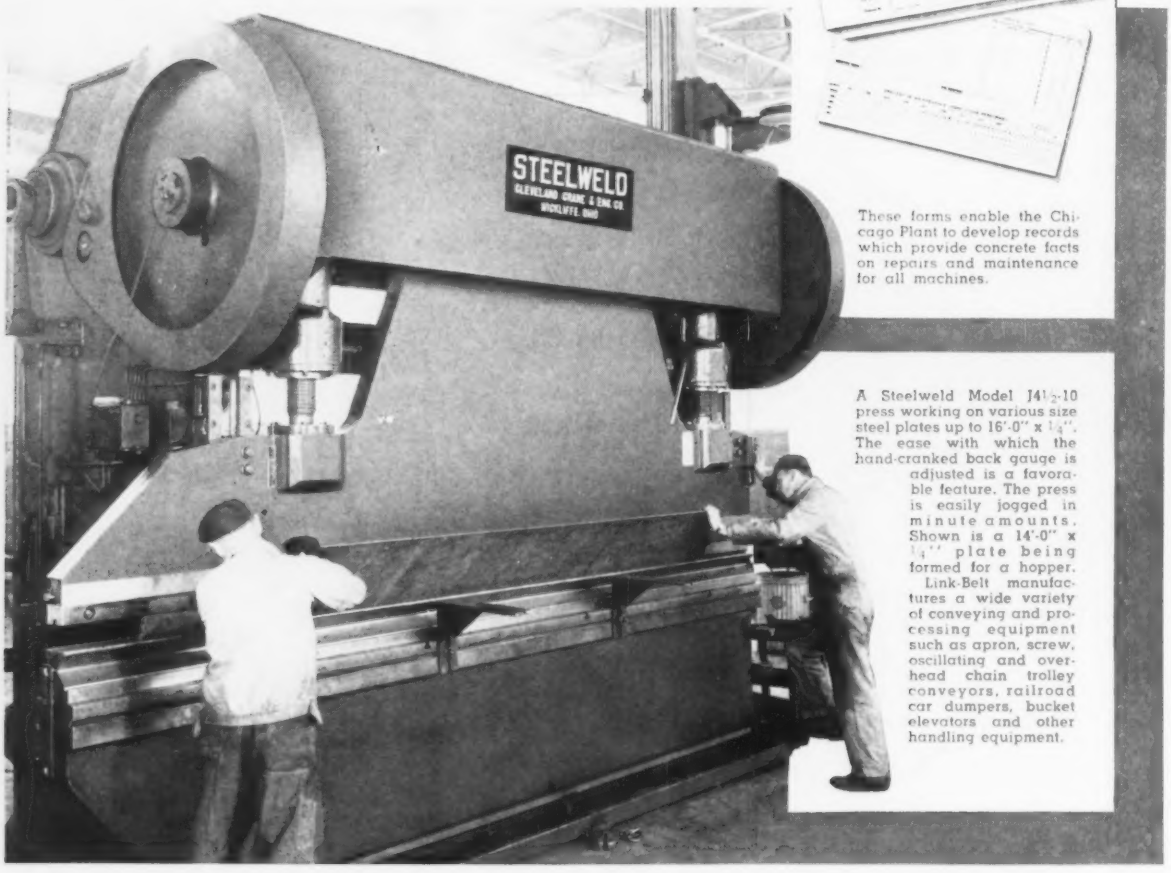
Street Address_____

City_____ Zone____ State_____

Accurate Records Prove

LOW COST OPERATION

These forms enable the Chicago Plant to develop records which provide concrete facts on repairs and maintenance for all machines.



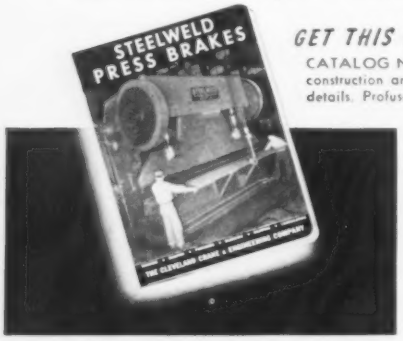
A Steelweld Model J41½-10 press working on various size steel plates up to 16'-0" x ¼". The ease with which the hand-cranked back gauge is adjusted is a favorable feature. The press is easily jogged in minute amounts. Shown is a 14'-0" x ¼" plate being formed for a hopper.

Link-Belt manufactures a wide variety of conveying and processing equipment such as apron, screw, oscillating and overhead chain trolley conveyors, railroad car dumpers, bucket elevators and other handling equipment.

SOME YEARS AGO the Pershing Road Plant of Link-Belt Company, Chicago, established a record system for keeping track of repairs and maintenance costs of all machine tools. This system provides a detailed history of maintenance required and lists every item of expense for every machine.

The record system proves that the maintenance cost for Steelweld machines, both bending presses and shears, is comparatively low.

Because of this, and the fact that Steelweld machines have many desirable operational features, a number of which are unavailable elsewhere, Link-Belt regards them highly. In fact, so much that 20 Steelweld Presses and Shears are now serving Link-Belt plants in nine cities.



GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

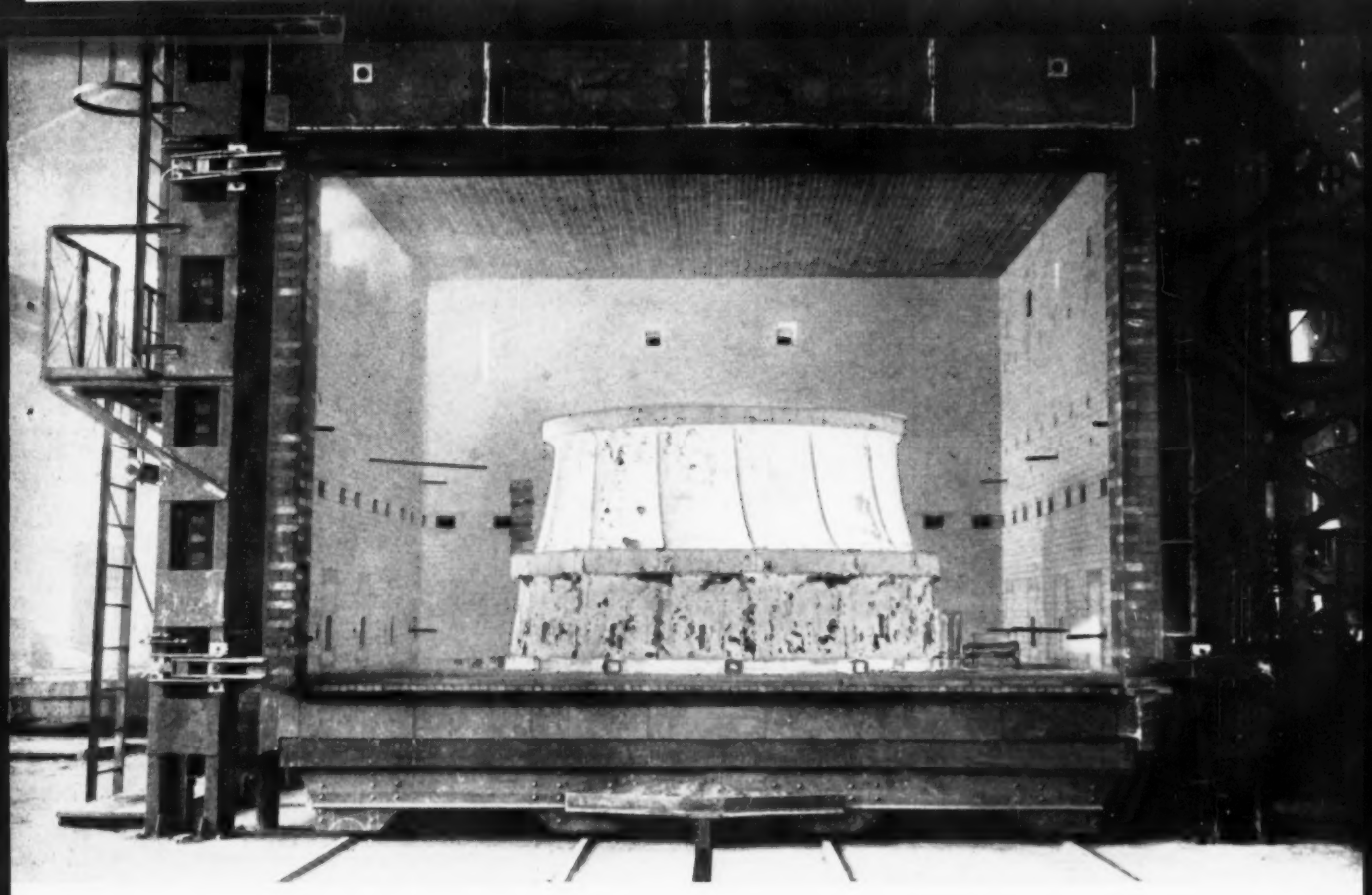
THE CLEVELAND CRANE & ENGINEERING CO.

1859 EAST 285th STREET • WICKLIFFE, OHIO

STEELWELD

PRESS BRAKES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



For best performance and maximum economy

7 different specialized refractories used in annealing furnace lining

Engineering a furnace lining with *specialized* refractories can save dollars on construction, fuel and maintenance as well as extend productive working time. To achieve these results, seven different B&W refractories were used in the lining of this 25′ x 23′ x 14′ annealing furnace.

Fuel savings and close temperature control were made possible by using three types of *lightweight* B&W Insulating Firebrick. Walls are composed of *B&W K-23 IFB* backed up with *B&W K-16*. Because of the proximity of the burners, the roof was constructed of *B&W K-26 IFB*, a higher temperature brick to guard against the effect of possible localized overheating.

The weight saving construction means about 100 lb less refractory material to heat up per sq ft than with ordinary firebrick, or about 28 tons less in the roof of the furnace. Furthermore, supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special steels.

To eliminate the need for expensive special shapes, the burner tunnels are formed of *B&W's 3000 F refractory castable, Kaocast*. Lintels over the burners and jambs are constructed of rugged *B&W Junior Firebrick*.

To take advantage of fast, easily installed castable construction, *B&W Kaocrete-D* was used in the nose arch (separately pictured). This sturdy castable with a 2500 F use limit was selected to provide strong resistance to abrasion caused by door operation. In addition, the need for costly fired shapes and their supporting castings was eliminated, as was a great deal of expensive engineering detailing.

Nose arch, cast of B&W Kaocrete D, immediately after removing forms.

The car top is insulated with *B&W Kaolite-20*, a 2000 F insulating refractory concrete.

For further information, write for B&W bulletin R-2-H on insulating firebrick and B&W bulletin R-35 on castables.

BABCOCK & WILCOX

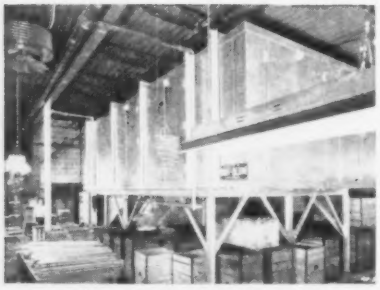
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

B&W

R-574

In the modern NUTONE plant

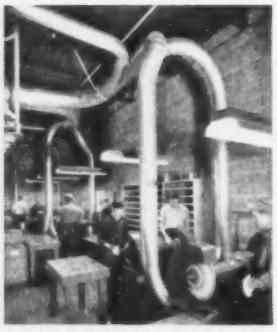
...6 DIFFERENT INSTALLATIONS By KIRK AND BLUM!



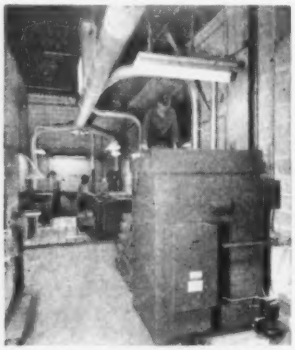
Overhead conveyorized Paint Drying Oven installed complete by KIRK & BLUM.

- 2 dust control systems
- Degreasing and acid etching ventilation
- Paint spray booths (installed only)
- Paint drying oven and conveyor
- Make-up air supply system

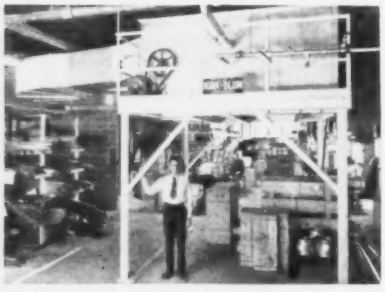
A variety of problems in the Finishing Departments of NuTone Incorporated were solved by KIRK & BLUM Engineers. Shown here are the various installations which were designed, fabricated and installed by KIRK & BLUM. Of special importance is the "Make-up" Air Supply System which filters, heats and replaces air exhausted by the other systems, eliminating undesirable winter drafts. The wide experience of the KIRK & BLUM organization is at your service. "Clean Air . . . the Invisible Tool" can do much to increase the efficiency of your operations. For more details and literature, write the Kirk & Blum Mfg. Co., 3200 Forrer St., Cincinnati 9, Ohio.



Two KIRK & BLUM Dust Control Systems serve the polishing and buffing room.



Fume Removal System in the Acid Etching and Degreasing Department.



"Make-up" air supply system replaces air exhausted from plant.

FOR CLEAN AIR . . . THE [redacted] TOOL

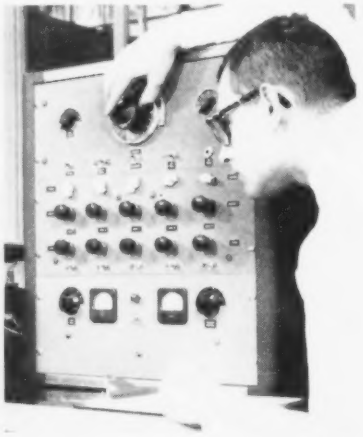
KIRK & BLUM

DUST AND FUME CONTROL SYSTEMS
INDUSTRIAL OVENS

NEW EQUIPMENT

Resistance Recorder

This equipment permits accurate multiple specimen inspection of fine gage copper-nickel resistance wire. It accommodates groups of five specimens at one time. The instrument directly computes the percentage change in resistance of each wire with such accuracy that temperature coefficients can be determined within ± 0.5 parts per million (.000-



0005) per ohm per degree centigrade over temperature intervals of 80° or more. Normal specifications for such wire require limits of ± 20 parts per million. In addition, the unit may also be used with a recorder to plot a continuous "change-in-resistance" curve for each specimen over the complete range of test temperatures. (Hoskins Mfg. Co.)

For more data circle No. 13 on postcard, p. 141

Leak Detector

So sensitive that it detects one part of helium in two million parts of air; that's how sensitive a newly-improved electronic leak detector is. The mass spectrometer leak finder spots faults in vacuum or pressure systems. (General Electric Co.)

For more data circle No. 14 on postcard, p. 141

No-pressure Gage

Extremely delicate parts such as light springs, bellows, diaphragms, vacuum tube grids, etc. can now be measured without fear of distorting

Pick exactly the right steel for any job from J & L's complete cold finished line

steel whorl production increased 22% with J & L LEADED STEEL

Superior uniformity and machinability of J & L 1113 Leaded Steel enabled this manufacturer to increase production from 110 to 140 pieces per hour. J & L Leaded Steels give you higher cutting speeds, longer tool life, improved finishes. Call your local distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

MACHINING PERFECTION always starts with the right steel

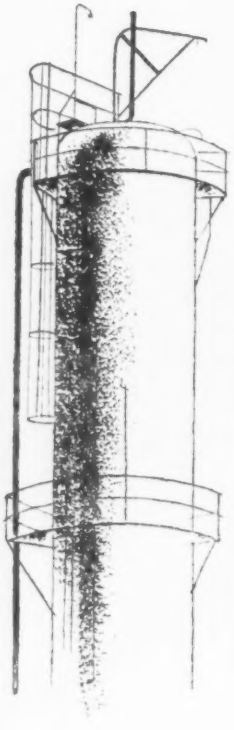
from tea strainers...

to catalytic crackers...

you will find

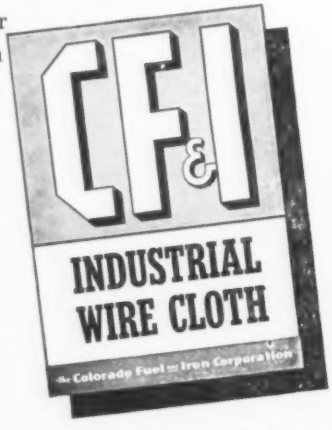
CF&I

INDUSTRIAL WIRE CLOTH



It's a versatile product, this CF&I Industrial Wire Cloth. For it plays an essential part in the tiny tea strainer and in the oil refinery's huge catalytic cracker. Chances are that you're using it—or could be using it—to good advantage right in your own operations.

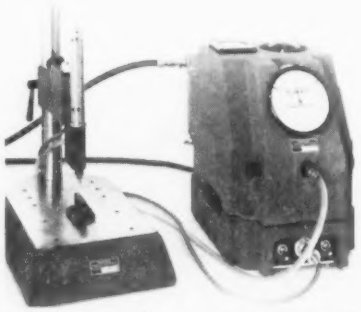
CF&I Industrial Wire Cloth will meet your most exacting specifications—whether it's for screening, filtering, grading, cleaning or processing. That's because CF&I Cloth comes in a wide variety of weaves and meshes and can be supplied in non-ferrous metals, as well as carbon and alloy steels. Why not get the complete details from your nearby CF&I representative today!



THE COLORADO FUEL AND IRON CORPORATION: Albuquerque • Amarillo • Billings • Boise • Butte Casper • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • Oakland Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle Spokane • Wichita • **WICKWIRE SPENCER STEEL DIVISION:** Atlanta • Boston • Buffalo • Chicago Detroit • New Orleans • New York • Philadelphia • **CF&I OFFICES IN CANADA:** Montreal • Toronto **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg

3675

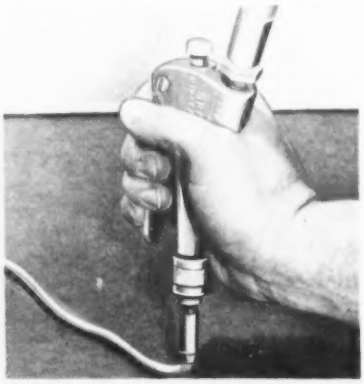
them. A "pressureless" comparator does the job. This air-electronic gage exerts practically no pressure on the workpiece. In fact, actual testing shows that it amounts to only 0.005 grams or approximately 1/10,000 of an ounce. The extremely low gaging pressure is obtained through an arrangement in which the sensitive gaging contact is raised and lowered by a special type of wire. The wire has rapid response to heat and is made to fluctuate in length by being alternately heated and cooled. (Federal Products Corp.)



For more data circle No. 15 on postcard, p. 141

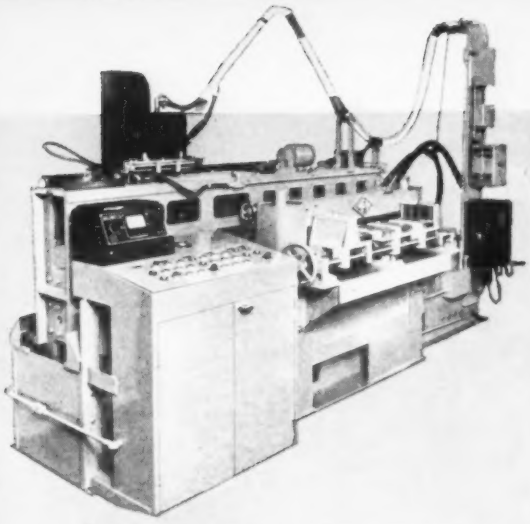
Grease Gun

Light in weight, this hand gun makes short work of sealers, mastics, caulking compounds, putties and similar materials. The high pressure gun is compact, easy to hold and weighs just 13 oz. Its body is of aluminum alloy. The control lever is manganese bronze. Flow rates are adjustable. (Gray Co. Inc.)



For more data circle No. 16 on postcard, p. 141

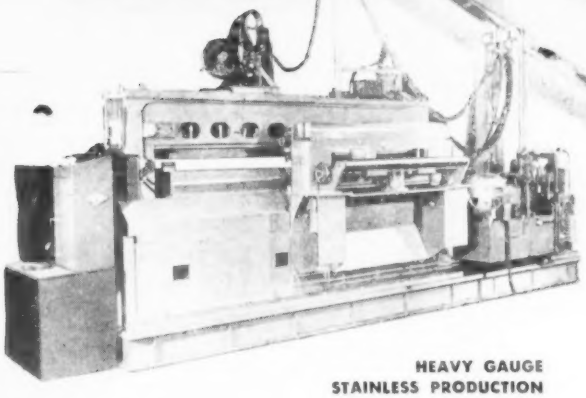
THE NEW MPM Shear Welder



CONTINUOUS SILICON SHEET PRODUCTION

Shearwelder for coil build up line for 42″ wide Silicon Steel from .015″ to .030″ thick.

.....more automation for even faster Steel Production!



HEAVY GAUGE STAINLESS PRODUCTION

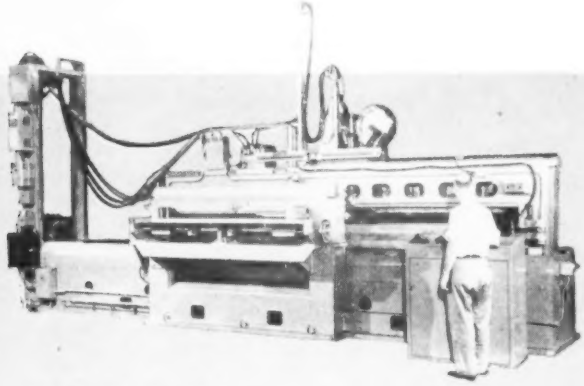
Shearwelder for butt welding 60″ wide x .250″ thick Stainless Steel.

● Metal Processing Machine Company's new Shearwelders are outstanding because of their advanced design incorporating automatically sequenced operations.

Shearing and welding are performed at the same station with positive clamping right at the work area, thereby insuring perfectly aligned butt welds.

"M.P.M." welds are **extremely ductile,** permitting subsequent rolling, forming, or blanking operations. Weld joints are smooth and require **no trimming.**

Rugged construction is insurance for minimum maintenance and compact design saves floor space.



MAJOR COIL BUILD UP

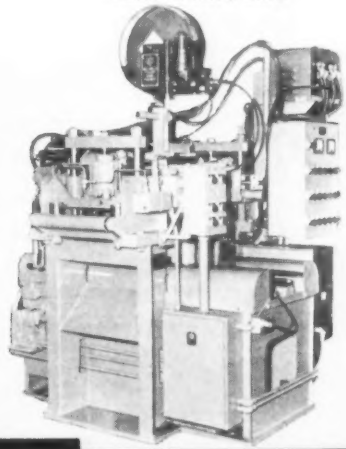
Shearwelder for Carbon Steel coil build up line for .015″ to .060″ thick x 72″ maximum width.

THE METAL PROCESSING MACHINE CO.

SUBSIDIARY OF McKAY MACHINE CO.

YOUNGSTOWN, OHIO

McK MPM



CONTINUOUS TUBE MILL PRODUCTION

Shearwelder used with strip looping device for splicing coil to coil to permit continuous production of tube mill.

10065

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 141.

Carbide Profilers

Profiling tools incorporating "throw-away" inserts are cataloged in a bulletin. Four styles of these carbide tools with a total of 18 standard variations in dimensions are offered. (Kennametal, Inc.)

For free copy circle No. 17 on postcard, p. 141

Reamers

A comparative reamer selector catalog clears some of the confusion from reamer picking. It features a unique arrangement of a company's line by decimal equivalents from 0.0400 to 3.000-in. (Lavallee & Ide, Inc.)

For free copy circle No. 18 on postcard, p. 141

Automated Welding

Automated welding machines reduce both part and equipment costs. That's the theme of a 4-page folder. It explains the workings of three designs and applications of the automated welders. (Expert Die & Tool Co.)

For free copy circle No. 19 on postcard, p. 141

Magnetic Handling

Materials handling via a magnetic conveyor is studied in a firm's written matter. It tells of a setup that transports small parts almost vertically up and over a high moving conveyor line. (Eriez Mfg. Co.)

For free copy circle No. 20 on postcard, p. 141

Screw Lock Inserts

Locking screw inserts are described in an 8-page bulletin. These inserts lock screws in tapped holes. They eliminate lock nuts, lock wiring and lock washers, the brochure says. (Heli-Coil Corp.)

For free copy circle No. 21 on postcard, p. 141

Tube, Fittings

Tubing, piping and welding fittings are covered in a pair of bulletins. They contain data on two materials. The first is 2¼ Cr, 1-pct Mo; the other, 1¼ Cr, ½-pct Mo. (Tubular Products Div., Babcock & Wilcox Co.)

For free copy circle No. 22 on postcard, p. 141

Wear-resist Steel

Abrasion resistant steel is described in a bulletin. It tells of a specially balanced composition for hardness and ductility. The material comes in sheet and plate. (Joseph T. Ryerson & Son, Inc.)

For free copy circle No. 23 on postcard, p. 141

Fire Protection

Fire protection systems offer many advantages when installed in a plant. Just how vital they are is told in a 36-page booklet. ("Automatic" Sprinkler Corp. of America.)

For free copy circle No. 24 on postcard, p. 141

Heavy-duty Drill

A dozen-page catalog details a new unit for heavy-duty drilling, reaming, spotfacing, boring and

Perforations perplexing you?

If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

...better call HENDRICK

Hendrick
MANUFACTURING COMPANY

37 DUNDAFF ST., CARBONDALE, PA. • *Sales Offices in Principal Cities*

Perforated Metal • Perforated Metal Screens • Wedge-Slot and Wedge Wire Architectural Grilles • Mitco Open Steel Flooring • Shur-Stile Treads • Armorgrids

counterboring, milling, and chamfering. The unit mounts horizontally, vertically or at any angle. (Avey Div., Motch & Merryweather Machinery Co.)

For free copy circle No. 25 on postcard, p. 141

Tubing

Integral type finned tubing is analyzed in an 18-page booklet. These tubes find applications in heat exchangers and like uses. (Wolverine Tube Div., Calumet & Hecla, Inc.)

For free copy circle No. 26 on postcard, p. 141

Electromanometer

Electromanometers are covered in a booklet. This is a precision pressure-measuring device for laboratory, field or automatic process control. (Consolidated Electrodynamics Corp.)

For free copy circle No. 27 on postcard, p. 141

Steel

Various types of steel processed at one company's mills are presented in an 8-page booklet. Also appearing are operations and services offered by the company. (Eaton Mfg. Co.)

For free copy circle No. 28 on postcard, p. 141

Drives

Mechanical and electronic drives are discussed in a booklet. It covers a variety of ac and dc motors, gearmotors, motor-generator sets, motor controls and complete packaged mechanical and electronic adjustable-speed drives. (Reliance Electric & Engineering Co.)

For free copy circle No. 29 on postcard, p. 141

Dock Boards

Magnesium dock boards are presented in a data sheet. These are permanent-type dock levelers for truck loading applications. They are light, easy to handle, and self-adjusting. An electric-hydraulic system provides for fully automatic operation. (Magline, Inc.)

For free copy circle No. 30 on postcard, p. 141

NOTHING BUT STEEL

keeps this thundering giant on its appointed course!

Roaring out of the night at 70 miles an hour, the freight train of today is moving thousands of tons — dependent entirely upon the strength, hardness, and toughness of the steel rails to keep it on its path!

NOTHING BUT STEEL

can do the job of steel!

TRU-STEEL, the pioneer high carbon, full heat-treated steel shot has the solidity, hardness and toughness that nothing but steel has — because

TRU-STEEL SHOT is TRUE STEEL, of tool steel quality

NOW IN 50 POUND BAGS

Write for full information on TRU-STEEL and what it can do for YOU in YOUR cleaning operation!

TRU-STEEL®

Manufactured by

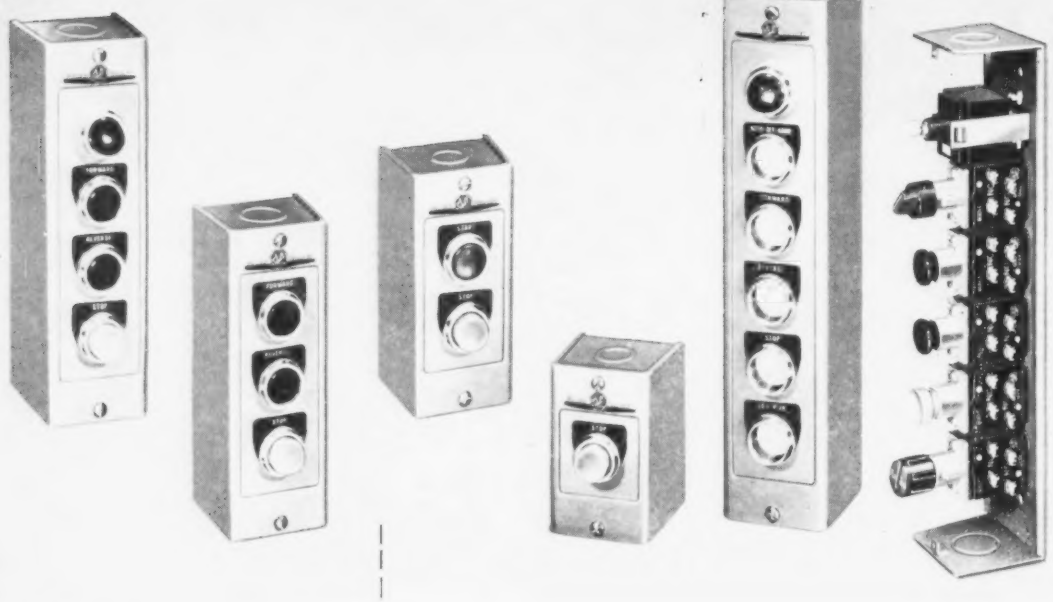
STEEL SHOT PRODUCERS, INC.

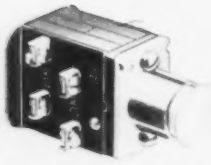
Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co.

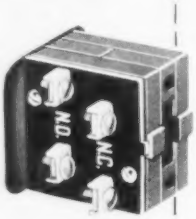
Pittsburgh 1, Pa.

Sold by Pangborn Corporation, Hagerstown, Md., and by leading distributors of foundry supplies from coast to coast.

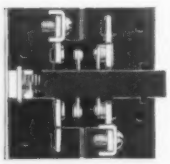




Various types of operators are available, such as standard head, mushroom head, coin slot, key type, wing lever, and 2 or 3-position selector switches. Buttons can be had in a variety of colors.



External view of the contact block, showing the normally open and normally closed contact terminals.



Internal view of contact block, showing stationary, double break N.O. and N.C. contacts. The push rod carries the moving contacts.

New HEAVY-DUTY PUSH BUTTONS

These new Bulletin 800 heavy-duty push buttons are the modernized version of the old, reliable line of Allen-Bradley heavy-duty stations. Advantages which . . . until now . . . have been restricted to oiltight stations used for machine tool service . . . have all been built into these new, heavy-duty stations . . . and you benefit from the result.

For instance, each button, selector switch, or pilot light is a self-contained unit which can be mounted singly or in groups—vertically or horizontally—in a variety of standard Allen-Bradley enclosures, or any other enclosure arranged for these units. The name plate reading will always be in the right direction. Double break, silver alloy contacts are used throughout.

No matter how special the station may be, it can be assembled on the job from a small stock of standard units. Standard enclosures accommodate up to 8 units. Enclosures for more than 8 units can be supplied on special order.

Please write for descriptive Bulletin 800.

Allen-Bradley Co.
1341 S. First St.
Milwaukee 4, Wis.

In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.

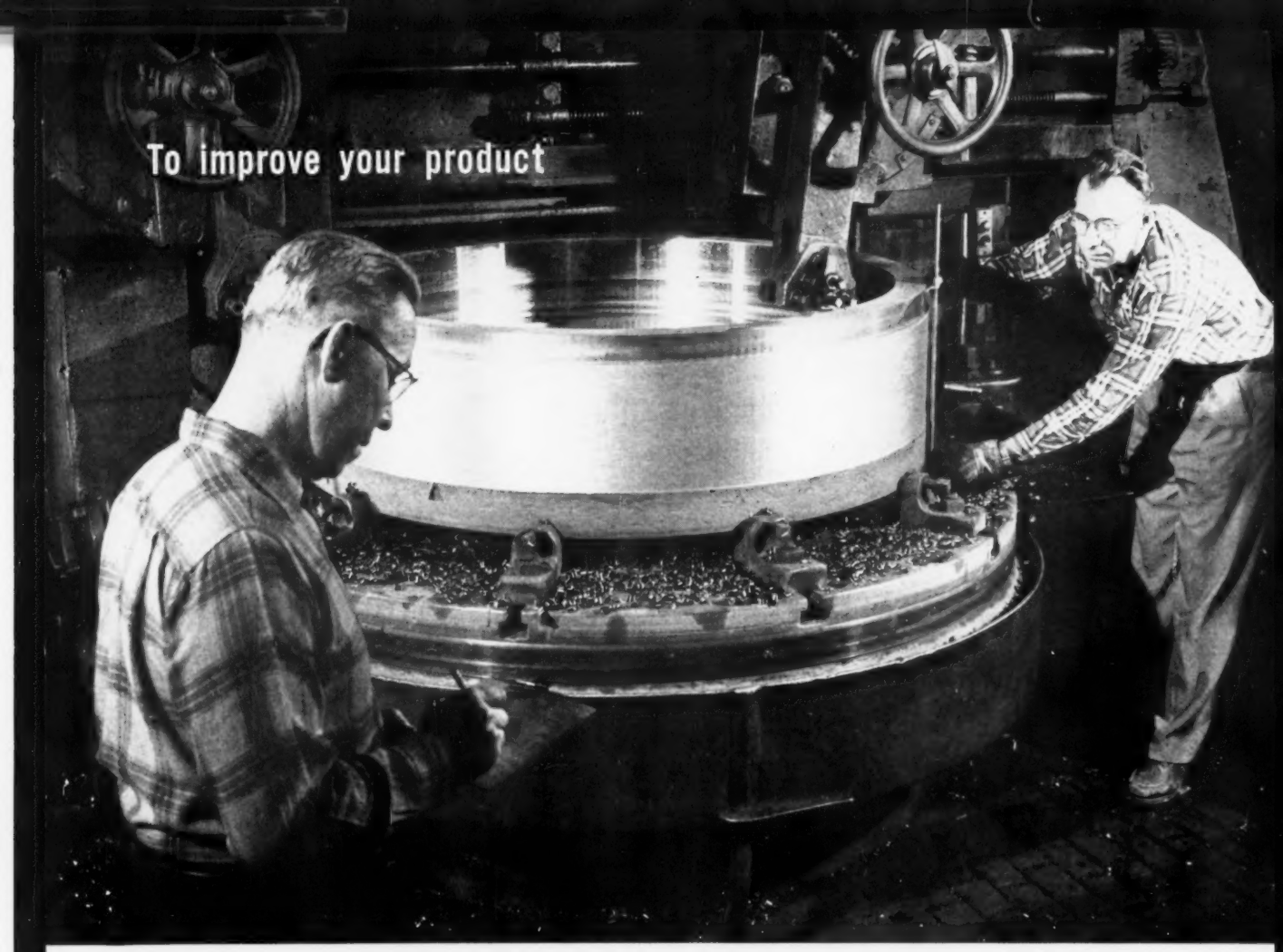
A-B Quality

THE SIGN OF
QUALITY
MOTOR CONTROL

ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY



BUY PROFIT IN ALCO CIRCULAR FORGINGS

Hi-Qua-Led Steel forgings, available in any AISI Open Hearth Grade, can reduce machining time more than half, or increase tool life up to 1600 per cent. ALCO's experience and equipment build cost-reducing uniformity into standard circular forgings from 18- to 145-in. OD

The big news is Hi-Qua-Led Steel. It was developed by ALCO to lower your machining costs on circular forgings — particularly in applications where a lot of metal must be removed. So far, customers using Hi-Qua-Led Steel forgings have reported as high as 69 per cent improvement in turning time, 41.2 per cent in teeth-cutting time. Hobbing tool life has been increased up to 1600 per cent. Even surface finish has been improved markedly.

There is no change in steel properties in Hi-Qua-Led Steel. It can be expected to perform exactly like a regular steel in the same grade. Customers report same response to heat treatment as regular steels.

You can profitably use Hi-Qua-Led Steel forgings if you put four or more hours machining into a circular forged piece, or if you do hobbing or other tough machining jobs with expensive tools. If your machining is not extensive, ALCO's regular circular forgings can still save you money with their high uniformity and exact conformance to your specifications.

We'd like you to have full information. Your nearest ALCO sales office will be happy to provide it, or, if you wish, you can receive complete explanatory information in Bulletins SF-1 and SF-2 by writing Spring & Forge Division, Dept. OCF-1, P.O. Box 1065, Schenectady 1, New York.

ALCO

ALCO PRODUCTS, INC.

NEW YORK

Sales Offices in Principal Cities

Locomotives · Diesel Engines · Nuclear Reactors · Heat Exchangers · Springs · Steel Pipe · Forgings · Weldments · Oil-Field Equipment

Maintenance cut 49% with SKF® anti-friction bearings

SKF "Triple-Seal" Pillow Blocks, used by an eastern limestone producer in pulverizing tube mills, have saved thousands of dollars since their installation in 1948.

In comparable operating periods, counter-shaft failures dropped from 11 to 2, bearing maintenance costs were cut 49%, production increased 70%, power savings averaged 10% to 20%.

Required to operate in a highly abrasive "snowstorm" of powdered limestone, these triple-sealed units continue to save money for the user. They will do the same for you.

For further information on how these remarkable "Triple-Seal" Pillow Blocks can be applied most effectively to your products, get in touch with your local **SKF** Sales Office. 7738

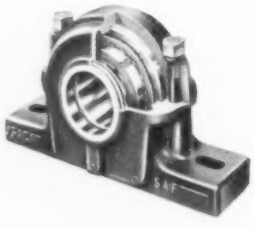
SKF

EVERY TYPE—EVERY USE

Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings ("Tyson")

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.



FREE LITERATURE

This section starts on Page 141.

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Hydraulic Presses

Standard model hydraulic presses in a comprehensive line are illustrated in a folder. It lists 28 operations possible on these presses. Precision built, the machines are designed for peak production performance. (K. R. Wilson, Inc.)

For free copy circle No. 31 on postcard

Boring Tools

Boring tools for toolroom and production jobs appear in a 12-page catalog. (Moore Special Tool Co.)

For free copy circle No. 32 on postcard

Pressure Gages

Pressure gages are described in a bulletin. (Norden-Ketay Corp.)

For free copy circle No. 33 on postcard

Carbide Tools, Dies

Carbide tools and dies are the subjects of an 8-page catalog. It lists advantages of these. (Jaquith Carbide Div., Pratt & Whitney Co., Inc.)

For free copy circle No. 34 on postcard

Emergency Power

When disaster strikes, keep in operation. That's the theme of an 8-page booklet that tells how to keep working in any power emergency. (Caterpillar Tractor Co.)

For free copy circle No. 35 on postcard

Turret Drill

Want to cut drilling costs? Well, a 20-page booklet says this about a firm's turret drilling machine: "It will save you so much money that you can't afford to be without it, even if your plant is loaded with conventional drilling equipment." The publication completely describes the unit, and includes a few written chuckles besides. (Howe & Fant, Inc.)

For free copy circle No. 36 on postcard

Greases

Industrial greases in a new line contain a non-soap organic thickener. This makes greases more stable than conventional gelling agents, according to a 4-page brochure. (Standard Oil Co.)

For free copy circle No. 37 on postcard

High-heat Alloys

Physical properties, applications and shape availability of four wrought high-temperature alloys are listed in a 4-page booklet. (Westinghouse Electric Corp.)

For free copy circle No. 38 on postcard

Air Pollution

Air pollution problems are discussed in a bulletin. It describes a new portable air pollution photometer for measuring and controlling outdoor and indoor air contamination. (Phoenix Precision Instrument Co.)

For free copy circle No. 39 on postcard

Gears

Gears and roadbuilding are discussed in a 4-page bulletin. It tells of a firm's gear making facilities for road machinery use. However, it also lists types and sizes of gears for many other applications also. (The Adams Co.)

For free copy circle No. 40 on postcard

Coagulants

Coagulant aids for water clarification are dealt with in a 4-page bulletin. These aids, it says, speed up floc formation and tend to produce large, heavy, tough flocs over wide pH ranges. (Hagan Chemicals & Controls, Inc.)

For free copy circle No. 41 on postcard

Job Shop

In 16 pages, a brochure outlines operations of a fabrication job shop.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **6/27/57**

Circle numbers for Free Technical Literature or Information on New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

If you want more details on product advertised in this issue fill in below:

Page ..... Product .....

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Your Name .....

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FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

BUSINESS REPLY CARD

No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77
Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY CARD

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FIRST CLASS
PERMIT No. 36
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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 6/27/57

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41	42	43	44	45	46	47	48	49	50
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PLEASE TYPE OR PRINT

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City ..... Zone .....

State .....

FREE LITERATURE

It reviews the firm's services in the fields of fabricating stainless steel and high temperature alloys. A section is devoted to the company's quality control setup which results in an "almost zero" rejection rate for "hot" jet engine parts. (Portland Copper & Tank Works.)

For free copy circle No. 42 on postcard

Micro Switches

Two micro switches are introduced in a pair of data sheets. The first is a mercury switch for pulse circuits; the other, a proximity switch. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 43 on postcard

Exothermics

An 8-page brochure deals with exothermic products. It describes them, gives directions on use, lists applications and results. Products include: liquidizers and fluxes for all metals and alloys. (Pittsburgh Metals Purifying Co., Inc.)

For free copy circle No. 44 on postcard

High-speed Steel

A bulletin gives data on a new high speed steel for woodworking applications. (Firth-Sterling, Inc.)

For free copy circle No. 45 on postcard

Arc Welding

Equipment for use with the tungsten arc Heliweld process is illustrated in a 20-page catalog. (Air Reduction Co., Inc.)

For free copy circle No. 46 on postcard

Stainless

Stainless steel sheet and strip is reviewed in a 32-page booklet. (Allegheny Ludlum Steel Corp.)

For free copy circle No. 47 on postcard

Research Service

A circular describes an industrial research and development service qualified to accommodate large as well as small industries. This four-page circular includes photographs showing a wide variety of laboratory equipment. (Bussey Research Laboratories, Inc.)

For free copy circle No. 48 on postcard

Thermocouple Tube

Thermocouple tubing is covered in a special analysis memo. Three special analyses are covered: Constantan, Chromel-P and Alumel. So is one special analysis: ingot ore. The memo gives properties and applications for the four materials as they relate to small tubing. (Superior Tube Co.)

For free copy circle No. 49 on postcard

Generators

Power where you want it, when you want it; that's the theme of an 8-page brochure. It introduces a line of generators and motor-generator sets to fit many power needs. (Leland Electric Co.)

For free copy circle No. 50 on postcard

Tractor

A fold-out spec sheet depicts a diesel powered crawler tractor. (Allis Chalmers Mfg. Co.)

For free copy circle No. 51 on postcard

Control Centers

Control centers for electric motor driven systems are outlined in a 16-page manual. (Square D Co.)

For free copy circle No. 52 on postcard

Fans

Semi-pressure fans appear in a folder. These fans are for use against static pressures normally considered above the range of propeller-type fans. (Aerovent Fan Co.)

For free copy circle No. 53 on postcard

Gear Shaving

Universal diagonal gear shavers are shown in a catalog. In its four pages, it presents three types of shaving machines. (National Broach & Machine Co.)

For free copy circle No. 54 on postcard

Now you can get from PROGRESSIVE Phillips Head Screws with an extra customized touch — Phillips Head Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.

Division of The Torrington Company

78 Norwood Street, Torrington, Connecticut

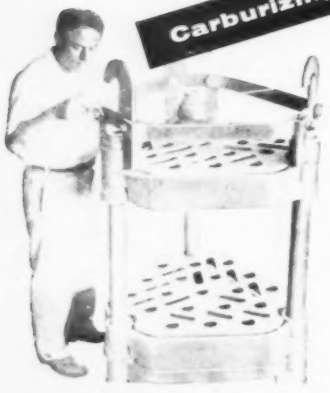
35% NICKEL

DURALOY

15% CHROMIUM

Furnace Castings

Here are two good examples of our work in high-nickel castings!



These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

If you would care to have our metallurgist study your casting problem, we shall be glad to have you call upon us for the service.

Our New General Catalog is Yours for the Asking

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

FREE LITERATURE

Wear-resist Alloy

Wear resistant liners for protection of blast cleaner parts subject to abrasive action are described in a bulletin. It gives data on two alloys available for wheel housings, drum heads and other blast-cleaner parts. (Pangborn Corp.)

For free copy circle No. 55 on postcard, p. 141

Carbide-tip Tools

Carbide-tipped cutoff tools and boring bars needn't chatter. So states a firm's data sheet. It describes a non-chattering metal that reduces vibration 50-pct. (Wendt-Sonis Co.)

For free copy circle No. 56 on postcard, p. 141

Industrial Trucks

A 16-page catalog lists all models in a firms extensive line of industrial materials handlers. These include fork trucks, powered hand units, towing tractors and many more models. (Clark Equipment Co.)

For free copy circle No. 57 on postcard, p. 141

Surface Treating

An 84-page booklet deals with surface treating of metals. It covers: rust prevention, mechanical and chemical cleaning, blackening, phosphating, etc. (E. F. Houghton & Co.)

For free copy circle No. 58 on postcard, p. 141

Automatic Filter

A 4-page folder presents a new dual purpose, fully automatic filter with interchangeable filter elements. Designed to handle lubricating oils and similar liquids, the filter is also suited for coolants. (Bowser, Inc.)

For free copy circle No. 59 on postcard, p. 141

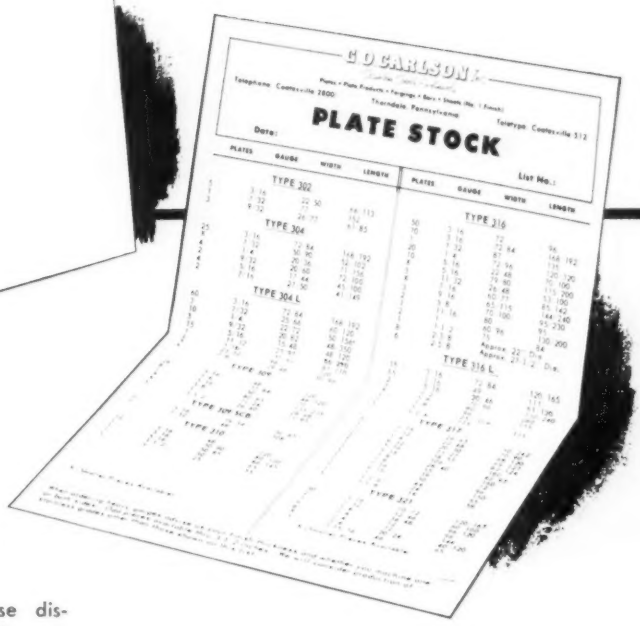
Alloy

For use in temperatures up to 1800°F is a 35-20 nickel-chromium-iron heating element alloy. A 12-page brochure describes it. (Hoskins Mfg. Co.)

For free copy circle No. 60 on postcard, p. 141

Keep up to date...

on Stainless Steel Plates and Heads



Carlson's Weekly Stock Lists tell you what you want to know:

- the Type, Gauge, Width and Length of stainless steel plates in stock.
- the Type, Gauge and Size of stainless steel heads in stock.
- the sales representatives and warehouse distributors in this country and Canada who are ready to serve you.

YOU can save time by checking these weekly stock lists. Here is an up-to-the-minute report on our large, diversified stock of stainless steel plates and heads that have been produced especially for chemical industry applications.

Carlson plates in Types 304-L, 316-L and 317-L are more and more in demand. Substantial stocks of these extra-low-carbon grades, along with other chromium-nickel Types 302, 304, 309, 309-S, 310, 316, 317, 321, 347 and 348 are available. Chromium grades 405, 410, 430 and 502-½% Mo are always in stock. Two precipitation-hardening grades, Types 17-4 PH* and 17-7 PH*—new plate grades that combine ease of fabrication, hardenability, high strength and corrosion resistance—are now in production and limited stocks are carried. To complete the story, stainless steel heads in Types 304, 304-L, 316 and 316-L are also stocked and can be shipped in a few days.

Make Carlson your *one-stop* source for that complete bill of material—stainless steel plates, heads, rings, circles, flanges, forgings, bars and sheets (No. 1 Finish).

When you need stainless plate . . .
Carlson gives you what you want when you want it!

*Trade Mark of ARMCO STEEL CORPORATION

G.O.CARLSON *Inc.*
Stainless Steels Exclusively
THORNDALE · PENNSYLVANIA
District Sales Offices in Principal Cities

G. O. CARLSON, INC.
120 Marshalton Road
Thorndale, Pennsylvania

Write for your copies of Carlson's Weekly Stock Lists . . . use this convenient coupon.

Name: .....

Company: .....

Address: .....

City: ..... State: .....

STEEL MEN!

WHAT IS THE COST OF A "CORHART BALANCED TANK"?

•

BECAUSE Corhart Electrocast sells for several times more than ordinary clay blocks, some operators have gotten the impression that a Corhart tank costs three or four times more than an all-clay furnace.

Nothing, however, could be further from the truth. By *balancing* his furnace with the proper amount of Electrocast, the average Corhart customer adds so little to the installation cost that the difference is repaid by *a fractional part of the extra production gained.*

If you have never obtained an estimate for a Corhart Balanced Tank, (a tank with all vulnerable spots fortified by Electrocast), we believe you will be more than surprised at the low cost for which this ideal type of installation can be made . . . . Send us the plans of your furnace, with a brief description of its past history. Using the experience gained in designing 65 Corhart Balanced Tanks, we will gladly recommend the amount and location of Electrocast needed to *balance* your furnace, and submit for your consideration complete blue-prints and quotations . . . . This service will cost you nothing, but it will probably prove the most interesting reading of the year. No obligation—and no high-pressure "follow-up." *Address:* Corhart Refractories Co., Incorporated, 16th and Lee Streets, Louisville, Kentucky.

QUALITY ECONOMY ENDURANCE

CORHART ELECTROCAST REFRACTORIES

WE RAN this ad for a Corhart Electrocast Refractory a little over 25 years ago—back when only a handful of glass manufacturers would think of using this new product, "one of the world's highest-priced refractories". Yet today virtually every furnace in the glass industry uses Corhart Electrocast . . .

Today Corhart 104 is new in the steel industry. And although it too is "one of the world's highest-priced refractories", it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to the glass industry.

Would you like to have complete data? Address: Corhart Refractories Co., *Incorporated*, 1628 West Lee Street, Louisville 10, Kentucky, U.S.A., SPring 8-4471.

QUALITY ECONOMY ENDURANCE

CORHART 104 ELECTROCAST REFRACTORY

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated*. Corhart Refractories Co., *Incorporated*, 1600 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471.

The Iron Age Summary

Summer Letdown Will Be Mild

Mills are more optimistic about summer output. August pickup will follow July low.

Market is expected to tighten considerably in October and continue firm until year-end.

■ The summer letdown in steel may not be as sharp as had been feared. Output probably will dip to a low point in July, but a pickup is looked for in August.

Some mills are beginning to feel better about July. The auto companies are showing tentative signs of life. At least one mill reports a pickup in auto orders heavy enough to strengthen July operating schedules.

Big Push Coming—Further support during the summer months will come from construction, oil and gas, shipbuilding, and freight cars —all users of heavier steel products. The big push from automotive will make itself felt in late August.

Steel men are warning their customers that the market will tighten considerably by October and remain firm through the fourth quarter. As a result, overall output for the year may be the second largest in history—bigger than last year's 115 million ingot tons, but maybe not as much as 1955's record 117 million tons.

Price Hedging—Despite the late date, some buyers last week were pressuring mills for delivery in June. Warehouses, distributors, and fabricators were among those trying to beat the steel price rise deadline of July 1. Some new ordering of off-the-shelf items developed on provision delivery is made in June.

If the expectations of some mills materialize, third quarter production should be fairly good. One major mill expects third quarter operations to aggregate 93 pct of capacity. Others will not do as well, depending on product mix, but overall output will be far from the dismal showing some predicted.

Lag In Tinplate—Tinplate shipments have not picked up as much as expected. Even so, electrolytic lines are operating at capacity. This means that mill inventories are building up. The current lag apparently is due to price hedging by the canners in April.

A paradoxical situation has developed in oil country goods. It is possible to obtain some tonnages of N-80 pipe for July even though some users are still waiting for orders 45 days past due. It seems that tube mills are worried about poor July bookings and don't want to take out time now to eliminate carryovers. At least that's the way one oil company purchasing agent sees it.

Quotas On Plates—Heavy plates and structural continue on a quota basis, with third quarter quotas already set. The mills have not gotten into the fourth quarter but see no signs of easing. Lighter plates and structurals are relatively plentiful at this time.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,228	Last Week 2,189	Month Ago 2,253	Year Ago 2,388
Ingot Index (1947-1949=100)	138.6	136.2	140.2	148.7
Operating Rates				
Chicago	84.0	84.5	87.0	95.0
Pittsburgh	90.0	86.0*	88.5	98.0
Philadelphia	97.0	100.0	102.0	107.0
Valley	74.5	73.0*	72.0	96.0
West	103.0	106.0*	101.0	103.0
Buffalo	102.0	102.0	95.0	105.0
Cleveland	90.0	87.0*	87.0	103.0
Detroit	99.0	103.0	88.0	100.0
S. Ohio River	81.0	84.0	92.0	90.0
South	93.0	93.0	93.0	23.5
Upper Ohio R.	85.0	84.0*	95.5	95.0
St. Louis	74.0	55.5	90.0	95.0
Northeast	66.5	66.5	66.5	85.0
Aggregate	87.0	85.5	88.0	97.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$54.83	$56.17	$47.50	$44.83
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, electrolytic	29.25	32.00	32.00	46.00
Lead, St. Louis	13.80	13.80	14.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	97.50	98.25*	98.375	95.00
Zinc, E. St. Louis	10.50	11.00	11.50	13.50

*Revised

Inventory Cuts Hit Fasteners

Easier supply gives purchasing agents best market in years. Inventory cuts responsible.

Few makers hedging against steel price increase. Price cutting negligible.

■ Industrial fasteners are in one of their easiest supply and demand markets in years. Purchasing agents who buy them are almost universally free to direct their worries to more troublesome spots.

Consumers generally are working down fastener inventories after continued accumulation into the first quarter of this year in which many producers shipped record quantities. The majority of users are still loaded or playing an exceptionally close inventory game.

No Price Hedging—The expected mid-year price increase expected to follow a steel price increase has lured few firms into price hedging.

Price cutting is still largely restricted to traditional outlets. Deliveries are off the shelf on standard items and a few weeks on specials.

The slack from automotive and appliance production has been fairly well bolstered by demand from other wide segments of industry. In the light fastener field, radio, television and other electronic industries are taking shipments equal to or ahead of last year. The heavy fastener market is largely being sustained by railroad car building. High tensile structural bolts and heavy mine roof bolts are also holding well but are more precision specialties than high tonnage.

Aircraft Market—Precision made aircraft bolts which have grown into a separate entity are enjoying volume ahead of last year. Mass production boltmakers are also giving the aircraft specialties field a new look. They feel in event of war they will be called upon to mass produce them again and want to have a history of manufacture for priority purposes. But specialty producers are holding their own nicely and sticking to strict specifications of the planemakers.

Geographically, fastener markets show little variation except on the West Coast. There it varies considerably. In Seattle and Portland volume is off up to 15 pct because housing and its supplier, the lumber industry, are slow. In San Francisco industrial and commercial construction is more than taking up the slack from decreased housing starts with a net gain of about 5 pct. In Los Angeles the aircraft volume in high priced specialties is good but autos and appliances are off 10-15 pct.

Import Problem — Foreign imports continue to score gains in California and north. Belgian and Swedish high alloy nuts are finding a good market.

Russell, Burdsall & Ward Bolt & Nut Co.

EASY MARKET: Many consumers are working off heavy inventories, so purchasing agents buying fasteners find the market to their liking.

Purchasers Elect

The Purchasing Agents Association of New York, Inc., last week elected David S. Gibson, of Worthington Corp. president for 1957-1958. Other officers elected were: F. S. Romanse, The Babcock & Wilcox Co., first vice president; George W. Baker, Port of New York Authority, second vice president; and Lewis A. Norris, New York Stock Exchange, treasurer.

Joining the association in 1951, Mr. Gibson has served on the board of directors since 1954, as second vice president in 1955-1956, and as first vice president prior to succeeding William F. Rae, Jr., of The Mennen Co., as president.

Delivery Promises At a Glance

New IRON AGE feature will be a big asset in determining what kind of service a steel buyer can expect.

In today's fast changing market, it's a must for any purchaser to keep up-to-date on delivery conditions.

■ Cold-rolled sheet delivery promises are down to about three weeks in the Midwest, but remain out as far as six to eight weeks in the East.

In contrast, heavy plate and structurals remain on quota in virtually all areas of the country.

These may be items of general knowledge to many steel purchasers. But in a fast-moving market these conditions can change overnight. Mills are concentrating on customer service and delivery to bolster their operating rates.

To provide a fast method of determining expected delivery for most steel products, THE IRON AGE is inaugurating a "Steel Markets at a Glance" service. It appears in table form on this page.

This will be repeated in the last issue of each month. A busy purchasing agent will be able to tell at a glance what service he can expect on specific products and in specific geographic areas of the country. A fast look can disclose in a minute any significant changes in the market and provide a valuable tool in planning your steel purchases.

Sheet and Strip—Delivery promises for hot and cold-rolled sheet have dropped to three or four weeks in **Chicago,** with no pickup expected before July. Rumors of new automotive purchases have not materialized there. In **Pittsburgh,** a small flurry of automotive buying created a stir and resulted in some increased tonnages. The automotive slowdown is having its effects in **Detroit,** with reduced output by Chrysler causing some additional softness. Heavy output by Ford and Chevrolet keep the total tonnage at a relatively good level, however.

Plates and Structurals — Heavy plates and structurals are still on a quota basis and are likely to remain that way for some time. Light plate is becoming more available and **Cleveland** mills can book some tonnages for August. In **Pittsburgh,** third quarter quotas have been set for heavy products. But light plates and structurals are more available. Sheet mills rolling light plate are generally booked into July. **West Coast** users are receiving more shipments from Eastern mills and an improved range of products is also noted.

Bars — Some **Pittsburgh** mills have slight carryovers into July, but in most cases they are current. There is little sign of hedge buying against price increases anywhere. There are still openings on rolling schedules in July. Some new automotive buying in **Detroit** was noted. Another hopeful indication is that although the market is still soft, it's believed that automotive companies' bar consumption has exceeded shipments for some time. Inventories could be close to the bottom.

Wire — A contradiction in the market picture is that the auto companies, which are refusing to buy ahead on most steel products, apparently are willing to put some money into hedge buying on wire products. This is responsible for some of the slight pickup in manufacturers' wire. But the market is not really strong, and little pickup is expected until September. Welded wire fabric for construction and road building is hottest product.

Note: The Ferroalloy price page does not appear this week. It will be resumed in the July 4 issue.

Steel Market At A Glance

	Delivery Promises					
	Pittsburgh	Chicago	Cleveland	Detroit	East	West Coast
CR Carbon Sheet	4-5 wks	3-4 wks	4 wks	3-5 wks	6-8 wks	Quota
HR Carbon Sheet	3 wks	4-6 wks	4 wks	4 wks	4-8 wks	Quota
CR Carbon Strip	4-5 wks	3-4 wks	3 wks		6-8 wks	4-6 wks
HR Carbon Strip	3 wks	4-6 wks	3 wks		4-6 wks	10 wks
HR Carbon Bars	2-3 wks	2-6 wks	4 wks	4 wks	4-6 wks	6 wks
CF Carbon Bars	2-3 wks	1-4 wks	2 wks	1-4 wks	1 wk	4-5 wks
Heavy Plate	Quota	Quota			Quota	Quota
Light Plate	2-4 wks	7-8 wks	5-6 wks		6-8 wks	Quota
Merchant Wire	4 wks	4 wks	2 wks		1-2 wks	4 wks
Oil Country Goods	8 wks & up	3rd Q.	Quota		Quota	
Linepipe	8 wks & up		Quota		Quota	4th Q.
Buttweld Pipe	1-2 wks		3 wks		1-2 wks	4-5 wks
Structurals	Quota	Quota				6 wks
CR Stainless Sheet	4-8 wks		3-4 wks		6-8 wks	
CR Stainless Strip	4-8 wks		3-4 wks		6-8 wks	

Market Weakens On Midwest Slump

The early summer upsurge is tapering off.

Export still holds Eastern markets. Inland weakness puts end to unexpected summer spurt.

■ The unexpected early summer rise in the market appears to be reaching its end.

After several weeks of rising prices, brought on by a need for most mills to replenish inventories, prices again are on the downtrend and will probably level off at a realistic summer level.

Weakness is most apparent in the Midwest, with the market stronger at the Coasts, and weakening progressively as export influence wanes inland.

The recent market jump, unprecedented in a period of an easing steel operating rate, was brought about by a market that was depressed to the point where scrap sources were drying up.

When mills returned to the market, they had to pay much higher prices to bring out the scrap. But the market quickly reached a point where dealers were eager to sell, with the resulting softening.

Meanwhile, the European Coal and Steel Community has promised to crack down on "restrictive" practices of its central scrap-buying agency. This promise was read into the record of the House Small Business Committee, which has been holding hearings on domestic and export scrap problems. If carried out, the crackdown would break an alleged near-monopoly of some U. S. scrap companies on exports to the six CSC companies. So says Wright Patman, chairman of the House probers.

Pittsburgh—Prices of openhearth scrap are off $1 to $2 as the broker market weakened after a period of high bidding. Early in the week brokers were offering the equivalent of $50 delivered in Pittsburgh for No. 2 bundles. By the end of the week, broker buying had dropped to $47 and lower. Dealers are not running to ship at these figures, but some tonnage is moving and the market is weaker at the moment.

Chicago—Tonnages of blast furnace grades are moving to the mills at lower prices. While turnings made the most spectacular slip, the entire list is weaker. Presaged by drops in broker buying prices earlier, dealers began to offer tonnages at these reduced prices. Broker offers again sank, for $2 to $4 drops across the list. Mixed borings and turnings were incorrectly quoted in the June 20 issue. Correct price was $38 to $39.

Philadelphia — Steelmaking grades are holding steady, supported by export activity. There is little action on the domestic market. One area mill is operating only three of five furnaces. Another mill is getting good quantities of additional scrap from its conversion production. Only cupola cast and unstripped motor blocks saw increases of $3 and $4, respectively.

New York—This market is in a hot weather lull. Prices so far are unchanged, and available material is moving nicely, but the pressure to bring out more scrap has definitely slackened.

Detroit — All market activities for scrap are at a standstill as dealers and brokers bide their time waiting for the large industrial lists to close. There is mixed feeling on the direction the market will take. Pessimism arises from anticipated reduced mill operations. However, reduced auto output will shorten the supply of industrial scrap, possibly forcing prices up.

Cleveland—Prices are unchanged in a quiet market. There is no new mill business and scrap is moving freely on what remains of old orders. The market is thin as major mills are buying only half their normal tonnages.

St. Louis—While heavy melting grades are unchanged, some items on the list are down in line with weaker markets in adjacent areas. A slight increase in movement is reported.

Birmingham—The rush to replenish inventories seems to have subsided, but there still seems to be confusion about the outlook. Some brokers look for a price drop. Others believe the slowdown is just a lull before new industrial and railroad lists close.

Cincinnati—The market here has an undertone of weakness, but there is no new business to peg the level. Area mills are not due to buy until after July 1.

Buffalo—Prices are unchanged in an inactive market. Dealer supplies are still scanty and coming plant vacations will cut down production scrap even more.

Boston — Prices are holding steady but market activity is off from the recent burst. There is little export demand. New England mills are buying, but not as much as previously.

West Coast—All major markets are quiet except for a slight flurry of buying of No. 2 bundles. Mills continue to eat into inventories

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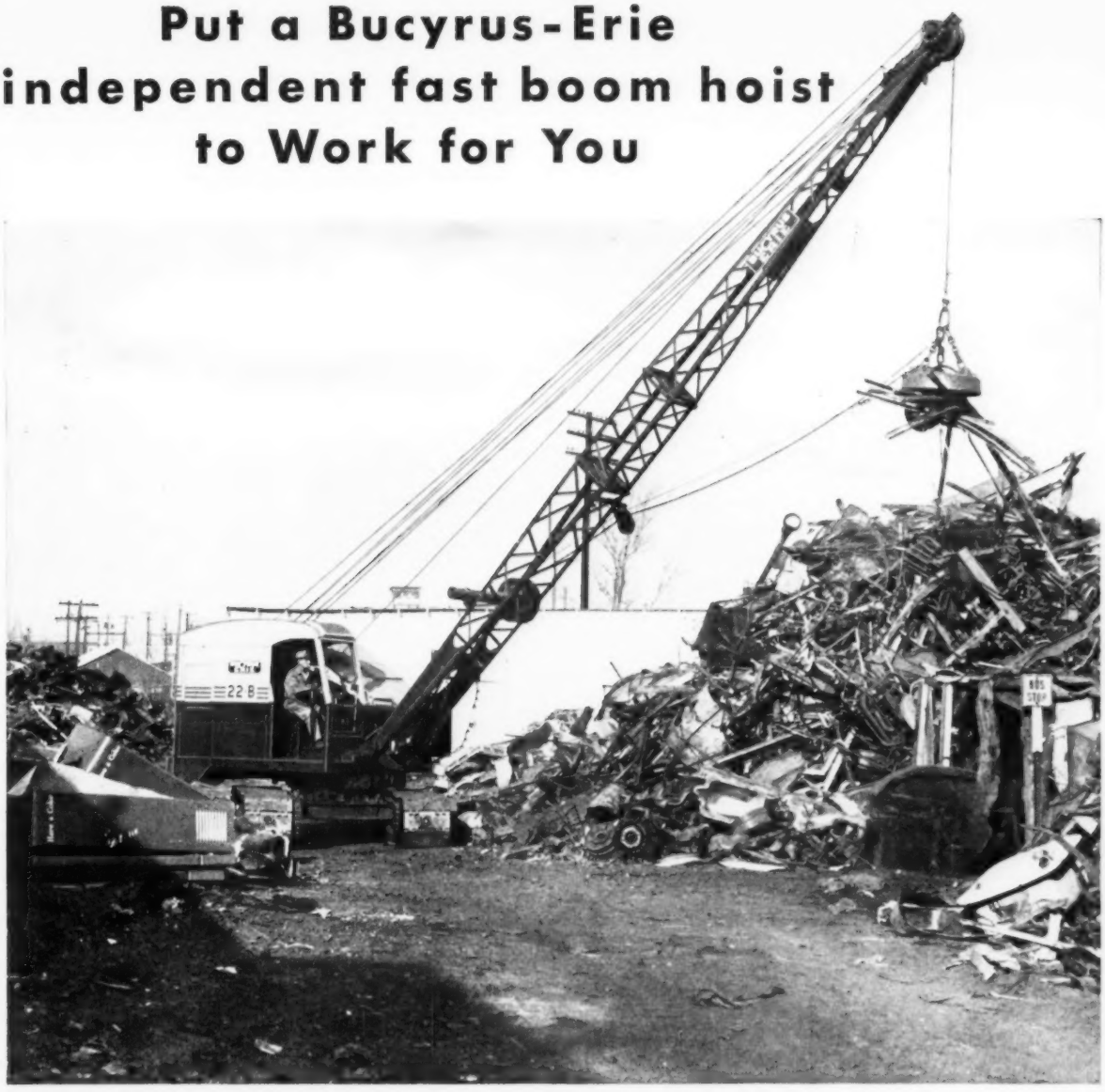

A 50-yr. old company in Arkansas steps up its scrap handling schedule with a Bucyrus-Erie 22-B crane equipped with a 40-ft. boom and a 39-in. dia. magnet. This unit sorts and stockpiles scrap iron, loads railroad cars and unloads trucks. Here's what the operator says: "The 22-B is fast, easy to handle and safe; one of the handiest features of all is that quick-action boom hoist".

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SCRAP PRICES *(Effective June 25, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	62.00 to 63.00
No. 2 bundles	47.00 to 48.00
No. 1 busheling	56.00 to 57.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and ms. turn.	33.00 to 34.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. punch'gs plate	62.00 to 63.00
Heavy turnings	52.00 to 53.00
No. 1 RR. hvy. melting	61.00 to 62.00
Scrap rails, random lgth.	67.00 to 68.00
Rails 2 ft and under	70.00 to 71.00
RR. steel wheels	69.00 to 70.00
RR. spring steel	69.00 to 70.00
RR. coupl'rs and knuckles	69.00 to 70.00
No. 1 machinery cast.	57.00 to 58.00
Cupola cast.	48.00 to 49.00
Heavy breakable cast.	46.00 to 47.00

Chicago

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 dealer bundles	52.00 to 53.00
No. 1 factory bundles	57.00 to 58.00
No. 2 bundles	42.00 to 43.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. forge crops	60.00 to 61.00
Low phos. punch'gs plate	56.00 to 57.00
Low phos. 3 ft and under	54.00 to 55.00
No. 1 RR. hvy. melting	60.00 to 61.00
Scrap rails, random lgth.	70.00 to 71.00
Rerolling rails	77.00 to 78.00
Rails 2 ft and under	77.00 to 78.00
Locomotive tires cut	63.00 to 64.00
Cut bolsters & side frames	64.00 to 65.00
Angles and splice bars	67.00 to 68.00
RR. steel car axles	83.00 to 84.00
RR. couplers and knuckles	61.00 to 62.00
No. 1 machinery cast.	51.00 to 52.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	45.00 to 46.00
Cast iron brake shoe	47.00 to 48.00
Cast iron wheels	54.00 to 55.00
Malleable	61.00 to 62.00
Stove plate	47.00 to 48.00
Steel car wheels	63.00 to 64.00

Philadelphia Area

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	48.00 to 50.00
No. 1 busheling	56.00 to 57.00
Machine shop turn.	38.00 to 39.00
Mixed bor. short turn.	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Shoveling turnings	41.00 to 42.00
Clean cast chem. borings	45.00 to 46.00
Low phos. 5 ft and under	59.00 to 60.00
Low phos. 2 ft and under	60.00 to 61.00
Low phos. punch'gs	60.00 to 61.00
Elec. furnace bundles	58.00 to 59.00
Heavy turnings	51.00 to 52.00
RR. steel wheels	65.00 to 66.00
RR. spring steel	65.00 to 66.00
Rails 18 in. and under	71.00 to 72.00
Cupola cast	48.00 to 49.00
Heavy breakable cast.	54.00 to 55.00
Cast iron car wheels	59.00 to 60.00
Malleable	61.00 to 62.00
Unstripped motor blocks	43.00 to 44.00
No. 1 machinery cast.	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 dealer bundles	51.00 to 52.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	41.00 to 42.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	22.00 to 23.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Cut struct'r'l & plates, 2 ft & under	58.00 to 59.00
Drop forge flashings	51.00 to 52.00
Low phos. punch'gs, plate	53.00 to 54.00
Foundry steel, 2 ft & under	49.00 to 51.00
No. 1 RR. heavy melting	57.00 to 58.00
Rails 2 ft and under	72.00 to 73.00
Rails 18 in. and under	73.00 to 74.00
Railroad grate bars	35.00 to 36.00
Steel axle turnings	33.00 to 34.00
Railroad cast.	56.00 to 57.00
No. 1 machinery cast.	55.00 to 56.00
Stove plate	49.00 to 50.00
Malleable	62.00 to 63.00

Youngstown

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	56.00 to 57.00

Buffalo

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 dealer bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	31.00 to 32.00
Low phos. plate	49.00 to 50.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	66.00 to 67.00
RR. steel wheels	53.00 to 54.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 cupola cast.	45.00 to 46.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	46.00 to 47.00
Drop forge flashings	46.00 to 47.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate	43.00 to 44.00
No. 1 cupola cast.	47.00 to 48.00
Heavy breakable cast.	43.00 to 44.00
Stove plate	44.00 to 45.00
Automotive cast.	53.00 to 54.00

St. Louis

No. 1 hvy. melting	$45.50 to $46.50
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	28.00 to 29.00
Machine hop turn.	30.00 to 31.00
Cast iron borings	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
No. 1 RR. hvy. melting	55.50 to 56.50
Rails, random lengths	66.00 to 67.00
Rails 18 in. and under	73.00 to 74.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	62.00 to 63.00
Std. steel car axles	72.00 to 73.00
RR. Specialties	61.00 to 62.00
Cupola cast	45.00 to 46.00
Heavy breakable cast.	41.00 to 42.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	43.50 to 44.50
Cast iron car wheels	49.00 to 50.00
Rerolling rails	71.00 to 72.00
Unstripped motor blocks	40.00 to 41.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	44.00 to 45.00
Elec. furnace, 3 ft & under	49.00 to 50.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and short turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Clean cast. chem. borings	32.00 to 33.00
No. 1 machinery cast.	42.00 to 43.00
Mixed cupola cast.	34.00 to 35.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 dealer bundles	42.00 to 43.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	32.00 to 33.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast.	46.00 to 47.00
Mixed yard cast.	41.00 to 42.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	36.00 to 37.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	37.00 to 38.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	28.00 to 29.00
Electric furnace bundles	49.00 to 50.00
Elec. furnace, 3 ft & under	47.00 to 48.00
Bar crops and plate	54.00 to 55.00
Structural and plate, 2 ft	54.00 to 55.00
No. 1 RR. hvy. melting	53.00 to 54.00
Scrap rails, random lgth.	59.00 to 60.00
Rails, 18 in. and under	65.00 to 66.00
Angles & splice bars	59.00 to 60.00
Rerolling rails	66.00 to 67.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Charging box cast.	34.00 to 35.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	43.00 to 44.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	28.00 to 29.00
Low phos. 18 in. & under	54.00 to 55.00
Rails, random lengths	62.00 to 63.00
Rails, 18 in. and under	70.00 to 71.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	55.00 to 56.00

San Francisco

No. 1 hvy. melting	$48.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	47.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	32.00
No. 1 RR. hvy. melting	48.00
No. 1 cupola cast.	53.00

Los Angeles

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	43.00
No. 1 dealer bundles	45.00
No. 2 bundles	$36.00 to 38.00
Machine shop turn.	32.00
Shoveling turnings	34.00
Cast iron borings	31.00
Elec. furn. 1 ft and under (foundry)	57.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast.	$52.00 to 53.00

Seattle

No. 1 hvy. melting	$46.00
No. 2 hvy. melting	42.00
No. 2 bundles	$28.00 to 30.00
No. 1 cupola cast.	47.00
Mixed yard cast.	47.00

Hamilton, Ont.

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	40.00
No. 1 dealer bundles	45.00
No. 2 bundles	34.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd	45.00
Bush., new fact., unprep'd	39.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	56.00
Cast scrap	52.00

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Big Drop in Copper Surprises Trade

Reduction in the price of producers' copper of 2¾¢ per lb catches trade by surprise.

Brass mills, fabricators, differ on effect the lower price will have on orders.

▪ Extent of the price drop on producers' copper took almost all consumers and traders by surprise. Pressure for a price reduction had been gaining weight for the last two weeks or so. But most market observers predicted a drop of only 1¢ to 2¢ per lb.

Phelps Dodge led the move down, dropping its price 2¾¢ per lb., to 29¼¢, on June 19. Kennecott followed the same day, Anaconda within 24 hours.

Market Is Confused—The smoke hasn't cleared yet. The unexpected extent of the drop has left the market in a slight state of confusion. Custom smelters reacted to the lower producers' price by lowering their price to 29¢ per lb. Major smelters report little business at this level. They say it is because consumers are taking time to appraise the situation.

Brass mills, one of copper's biggest consumers, are divided as to what they think the impact of the lower price will be on the market. All agree that it will take some time for the effect of the lower price to be felt.

Tube Mills Pessimistic—Several tube mills agree that the lower price won't have much of an effect on orders. The sales manager of one mill reports some of his jobber customers are wondering if the price might not go still lower. The other mill says that business has been dull through most of the year and will probably continue to be dull despite the lower price.

A rolling mill and a copper distributor are more hopeful. They both expect sales to pick up, but not until August. Neither consider the lower price as the key factor in the expected boost in business. The sales manager of the distributor reports his company is receiving the same number of orders as during 1956, but for about half as much metal. He believes his customer inventories are about as low as they can get, and will need replenishing after July vacations.

Expect August Pickup—An executive in the rolling mill says his business is due for a pickup in August anyhow, and that the lower price won't speed things up much. He admits the extent of the producers price drop surprised him. He suggests the possibility of a fractional cent recovery in the price if things tighten up enough in late August.

Zinc

The big question in producers' and smelters' minds these days is how far down will the price have to go before it can generate consumer interest. The zinc price took its fourth tumble in less than 2 months, on June 19, another ½¢. Prime Western now costs 10.50¢ per lb., at E. St. Louis. But the market continues to be as soft as if nothing had happened.

Some traders are starting to say it's either some form of government support, or 9¢ zinc. But most consumers aren't talking, or buying, until the General Services Administration comes into the market.

It's pretty well agreed that GSA will be in. The big question is how much domestic zinc it will buy for the long term stockpile. If GSA takes more than it did in May it could firm the price up enough to carry it through July at current levels.

Tin

The market in both New York and London has been at its steadiest in 1957 during the last few weeks. Changes have been restricted within a few cents spread. A cable from a London contact of one of the major New York traders says, "Cannot explain steadiness here. Only explanation possible is buffer buying."

Many New York traders believe this is the answer, expect a relatively steady market at least until July 30, when a report of the condition of the buffer stock holdings is due.

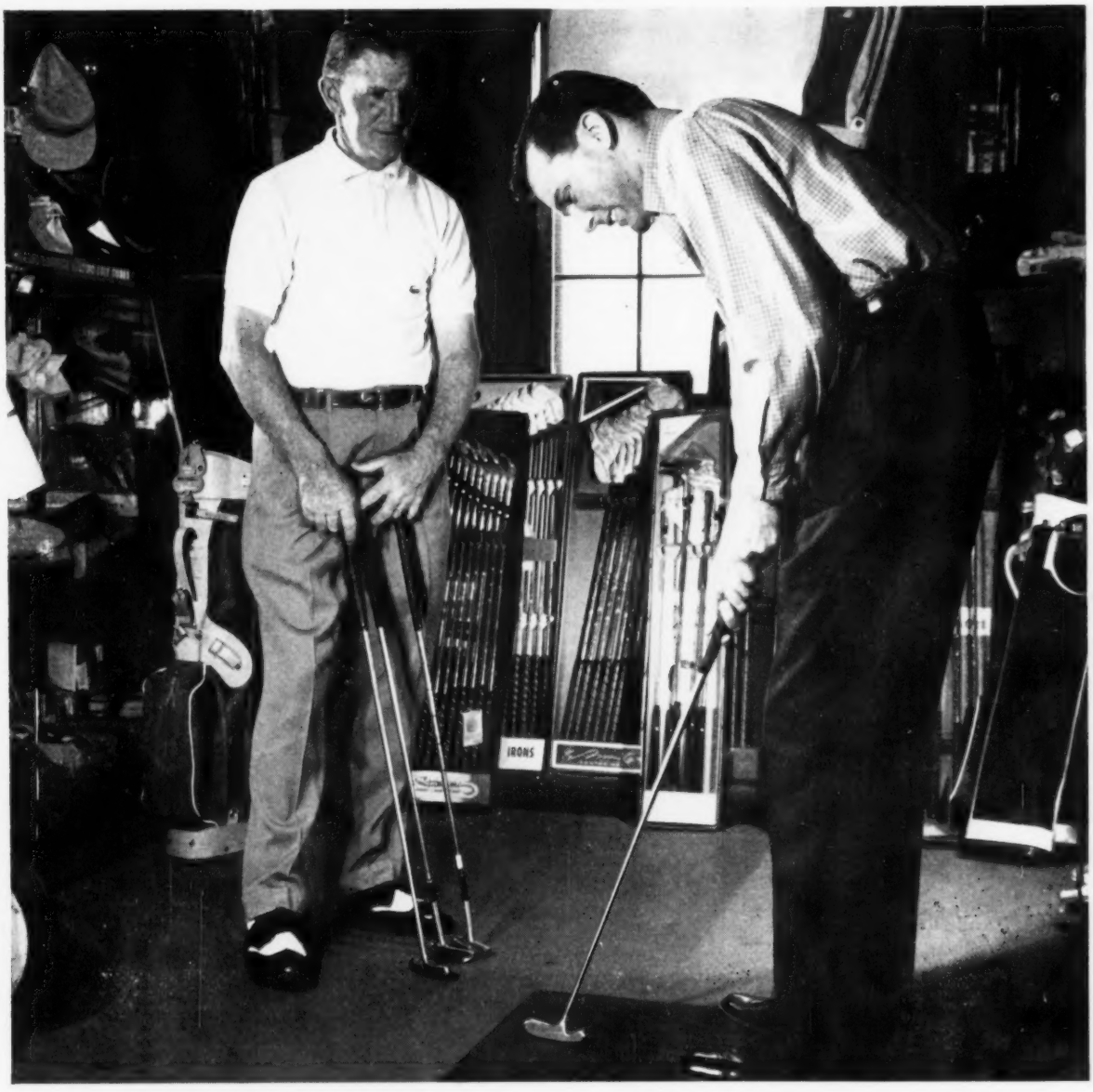
Tin prices for the week: June 19—98.125; June 20—97.875; June 21—97.75; June 24—97.625; June 25—97.50.*

* Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	29.25	32.00	6/19/57
Copper (CS)	29.00	30.00	6/19/57
Copper (L)	29.25	32.00	6/19/57
Lead, St. L.	13.80	14.80	6/11/57
Lead, N. Y.	14.00	15.50	6/11/57
Magnesium ingot	36.06	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	200-250	250-275	6/6/57
Zinc, E. St. L.	10.50	11.00	6/19/57
Zinc, N. Y.	11.00	11.50	6/19/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 156.



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NONFERROUS MARKETS *(Effective June 25, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1890, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-78.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size"	1/4	5/8-5/8	3/4-1	1 1/4-1 1/2
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.010 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage →	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	108.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor →	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	51.38		48.61	51.57
Brass, 70/30	44.69	45.23	46.63	47.60
Brass, Low	47.40	47.94	47.34	50.21
Brass, R.L.	48.36	48.90	48.30	51.17
Brass, Naval	48.85		43.16	52.26
Muntz Metal	46.94		42.75	
Comm. Bz.	49.86	50.40	49.80	52.42
Mang. Bz.	52.29		46.69	
Phos. Bz. 5%	70.47		70.97	

Free Cutting Brass Rod 32.87

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy, $10.00; Bar, HR or forged, commercially pure, $6.15-6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) ....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $39.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz...$ 2.25
Iridium, dollars per troy oz....$90 to $100
Lithium, 98% .....$11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York .....$255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$23 to $24
Platinum, dollars per troy oz....$92 to $95
Rhodium .....$120.00 to $125.00
Silver ingots (¢ per troy oz.) 90.250
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium .....$ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.50
No. 120 ..... 28.50
No. 123 ..... 27.00
80-10-10 ingot
No. 305 ..... 33.50
No. 315 ..... 31.50
88-10-2 ingot
No. 210 ..... 41.25
No. 215 ..... 37.50
No. 245 ..... 33.50
Yellow ingot
No. 405 ..... 24.00
Manganese bronze
No. 421 ..... 27.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.00-24.75
0.60 copper max. 23.75-24.50
Piston alloys (No. 122 type)..22.50-24.50
No. 12 alum. (No. 2 grade)...20.50-22.00
108 alloy 21.00-22.00
195 alloy 23.50-25.00
13 alloy (0.60 copper max.)...23.75-24.50
AXS-679 .....21.00-22.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 22.00-22.75
Grade 2—92-95% 20.50-21.50
Grade 3—90-92% 19.50-20.50
Grade 4—85-90% 18.75-19.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	25¼	24½
Yellow brass	19⅛	17⅝
Red brass	22¼	21½
Comm. bronze	23⅛	22⅝
Mang. bronze	17⅝	16⅞
Yellow brass rod ends	18⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¾
No. 2 copper wire	22⅞—23¼
Light copper	20⅝—20¾
*Refinery brass	22 —22½
Copper bearing material	21½—22

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¾
No. 2 copper wire	22⅞—23¼
Light copper	20⅝—20¾
No. 1 composition	22½
No. 1 comp. turnings	22
Hvy. yellow brass solids	16½
Brass pipe	18½
Radiators	17½
Aluminum	
Mixed old cast	13½—14⅛
Mixed new clips	15 —16
Mixed turnings, dry	14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	21 —21½
No. 2 copper wire	19½—20
Light copper	17¾—18¼
Auto radiators (unsweated)	13½—14
No. 1 composition	18½—19
No. 1 composition turnings	18 —18½
Cocks and faucets	14½—15
Clean heavy yellow brass	12½—13
Brass pipe	15½—16
New soft brass clippings	17 —17½
No. 1 brass rod turnings	14¼—14¾

Aluminum

Alum. pistons and struts	5½— 6
Aluminum crankcases	10½—11
1100 (2S) aluminum clippings	13½—14
Old sheet and utensils	10½—11
Borings and turnings	6½— 7
Industrial castings	10½—11
2024 (24S) Clippings	12 —12½

Zinc

New zinc clippings	4 — 4½
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	85-90
Clean nickel turnings	70-75
Nickel anodes	85-90
Nickel rod ends	85-90
New Monel clippings	45-48
Clean Monel turnings	35-40
Old sheet Monel	44-45
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	9½—10
Battery plates (dry)	4¼— 4½
Batteries, acid free	2¾— 3

Miscellaneous

Block tin	75 —76
No. 1 pewter	59 —60
Auto babbitt	39 —40
Mixed common babbitt	11 —11½
Solder joints	15½—16
Siphon tops	42
Small foundry type	13 —13¼
Monotype	13 —13¼
Lino. and stereotype	12 —12¼
Electrotype	11 —11¼
Hand picked type shells	8 — 8½
Lino. and stereo. dross	3¾— 4
Electro. dross	3 — 3¼

COMPARISON OF PRICES

(Effective June 25, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	June 25 1957	June 18 1957	May 27 1957	June 26 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625	4.625	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	June 25 1957	June 18 1957	May 27 1957	June 26 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.48
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$56.50*	$57.50	$47.50	$44.50
No. 1 steel, Phila. area	56.50	56.50	51.50	46.50
No. 1 steel, Chicago	*51.50*	54.50	43.50	43.50
No. 1 bundles, Detroit	46.50	46.50	39.00	37.50
Low phos., Youngstown	56.50	56.50	48.50	46.50
No. 1 mach'y cast, Pittsburgh	**57.50**	56.50	56.50	54.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	56.50	54.50
No. 1 mach'y cast, Chicago	*51.50*	54.50	47.50	47.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$51.83*	$56.17	$47.50	$44.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	*29.25*	32.00	32.00	46.00
Copper, Lake, Conn.	*29.25*	32.00	32.00	46.00
Tin, Straits, New York	*97.50*†	98.25*	98.375	95.00
Zinc, East St. Louis	*10.50*	11.00	11.50	13.50
Lead, St. Louis	13.80	13.80	14.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 161→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	66.50	67.00	67.50	68.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	64.50	65.00	65.50	66.00	.....
Buffalo *H1*	64.50	65.00	65.50	66.00	.....
Buffalo *W6*	64.50	65.00	65.50	66.00	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	64.50	65.00	65.00	65.50	.....
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	.....
Duluth *I6*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00	.....	.....
Fontana *K1*	72.50	73.00	.....	.....	.....
Geneva, Utah *C7*	64.50	65.00	.....	.....	.....
Granite City *G2*	66.40	66.90	67.40	.....	.....
Hubbard *Y1*	.....	.....	65.00	.....	.....
Ironton, Utah *C7*	64.50	65.00	.....	.....	.....
Midland *C11*	64.50	.....	.....	.....	.....
Minnequa *C6*	66.50	67.00	67.50	68.00	.....
Monessen *P6*	64.50	.....	.....	.....	.....
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*	.....	65.00	65.50	66.00	.....
Sharpsville *S3*	64.50	65.00	65.00	65.50	.....
So. Chicago *R3*	64.50	65.00	65.00	.....	.....
Swedeland *A2*	66.50	67.00	67.50	68.00	.....
Toledo *I4*	64.50	65.00	65.00	65.50	.....
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*	.....	.....	65.00	65.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $78.50; Jackson, *J1, I4* (Globe Div.), $77.25; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25-40.50	41.00-41.25	44.00	43.75	66.75-67.00	50.50-51.00	59.25-59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1;* New Bedford, Mass. (.25¢ per lb higher), *R6;* Gary *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forgings billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

STEEL PRICES

(Effective June 25, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5, N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3, W8*	$107.00 *U1, R3, W8*	5.90 *U1*	5.00 *U1, W8* 5.00 *P13*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1, T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9, T8*
	Cleveland, Ohio									6.85 *A5, J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2, G3, D2, P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1, I3*	5.25 *I3*	4.675 *U1, I3, Y1*	6.85 *Y1*	6.95 *U1, I3, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R5*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3, B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3, F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1, C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B3*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.					5.20 *A8*			4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2, R3* 5.00 *C16*	7.35 *T2*		4.675 *T2, R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

STEEL PRICES

(Effective June 25, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.			Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.														
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*				5.80 *W6*			
	Claymont, Del														
	Coatesville, Pa.														
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.											5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*					$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*			5.90 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.											6.10 *A5*			
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.											6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*										
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*											
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*		5.80 *A5,R3, N4,W8,K2*			
	Sterling, Ill.											5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*				5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*							
	Newport, Ky.	4.675 *A9*	5.75 *A9*												
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*				5.80 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*									$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.40 *C9*								5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*									
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*									
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*						$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*			5.80 *A5, P6,J3*	$10.05 *J3, U1*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*									5.30 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*					$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*				5.30 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*					$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	4.775 *C7*													
	Kansas City, Mo.											6.05 *S2*			
	Los Angeles, Torrance, Cal.											6.60 *B2*			
	Minnequa, Colo.											6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*								6.60 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.														
SOUTH	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*								5.80 *T2,R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.											6.05 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.
ELECTRO 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.

IRON AGE

STEEL PRICES

(Effective June 25, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5*						7.50 *A5,W6*
						8.625 *B5*						9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9 W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1,Y1*	7.25 *U1,Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*	5.275 *A8*									7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

†Merchant Quality—Special Quality .35¢ higher.

STEEL PRICES *(Effective June 25, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		⅜ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M3*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	4.50	5.25	+20.25	1.25	+15.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	list	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75	+13.00	4.75	+9.00	7.75	+4.50	8.25	+5.75	8.75	+4.75	9.25	+4.25	9.75	+5.50								
Pittsburgh *J3*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M3*	13.75	+2.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Wheeling *W5*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	list	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+9.50	11.25	+4.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium . . .83 D-3, D-5
Oil hardened manganese .45 O-2
Special carbon .41 W-1
Extra carbon .345 W-1
Regular carbon .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (A3, J2, L4) 10 pct	15 pct	20 pct	Sheet (I2) 20 pct
Stainless Type	302				35.50
	304	36.20	40.30	44.50	37.75
	316	41.60	45.90	50.15	55.50
	321	37.95	42.10	46.40	44.75
	347	41.25	46.45	51.70	54.25
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	9.00	9.70	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60		
		Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3) (20¢ higher, HR); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181		195	187	8.10	8.50
Aliquippa, Pa. *J3***	164	179			181	8.20	8.875
Atlanta *A2***	166	182		192	190	8.05	8.65
Bartonville *K2***	166	182		198	190	8.30	9.06
Buffalo *W6*						8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173					8.20	8.75
Cleveland *A5*						8.20	
Crawfordsville *M4***	166	182		198	190	8.30	9.05
Donora, Pa. *A5*	164	176		196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176		196	184	8.20	8.75
Galveston *D4*‡	169						
Houston *S2*	169	181		195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167		188	8.20	8.90
Joliet, Ill. *A5*	164	176		196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178		198	186	8.30	8.85
Los Angeles *B2***						9.15	9.90
Kansas City *S2**	169	181		195	189	8.45	9.00
Minnequa *C6*†	169	181	172	201	189	8.45	9.00
Monessen *P6*	167	185			191	8.10	8.10
Palmer, Mass. *W6*						8.50	9.05
Pittsburg, Cal. *C7*	183	199		220	204	9.15	9.70
Rankin, Pa. *A5*	164	176			184	8.20	8.75
So. Chicago *R3*	167	181		195	187	8.10	8.50
S. San Francisco *C6*†				220		9.15	9.70
Sparrows Pt. *B3***	166			198	190	8.30	9.00
Struthers, O. *Y1**						8.20	8.85
Worcester *A5*	170					8.50	9.05
Williamsport, Pa. *S5*			175				

* Zinc less than .10¢ † Plus zinc extras.
** 11-12¢ zinc. ‡ Wholesalers only.
*** .10¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*		10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	
Detroit *D2*	8.75	10.20	12.40		
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30		
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*			12.60	15.60	18.55
Indianapolis *C5*	8.80	10.25	12.30	15.30	18.25
Los Angeles	10.85	12.30	14.50		
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S7*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.45
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	8.65	10.10	12.30	15.30	18.25

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	
	2½	12	48.94	57.31	44.73	
	3	12	56.51	66.18	51.66	
	3½	11	65.97	77.25	60.30	
	4	10	87.61	102.59	80.07	
National Tube	2	13	36.34	42.56	33.21	
	2½	12	48.94	57.31	44.73	
	3	12	56.51	66.18	51.66	
	3½	11	65.97	77.25	60.30	
	4	10	87.61	102.59	80.07	
Pittsburgh Steel	2	13	36.34	42.56		
	2½	12	48.94	57.31		
	3	12	56.51	66.18		
	3½	11	65.97	77.25		
	4	10	87.61	102.59		

WARE-HOUSES

Metropolitan Price, dollars per 100 lb

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.58	8.45		10.23				
Baltimore	$.10	7.98	9.08	9.31	8.46	8.36	8.85	8.53		9.13	14.99	14.44	18.39	18.09
Birmingham	.15	7.80	9.00	9.52	7.82	8.16	8.20	8.07	8.44	10.04 10.12				
Boston	.10	8.94	9.98	11.06	8.99	9.28	9.20	9.17	9.57		15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.83	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.80	7.97	8.31	8.35	8.22	8.50	8.50	15.30	14.30	15.65	17.90
Cincinnati	.15	8.09	9.20	9.80	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.70	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver		9.70	11.30	12.49	9.80	9.70	9.80	9.95		10.65				17.60
Detroit	.15	8.18	9.40	10.15	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston		8.80	9.75		7.75	8.80	8.00	8.05		10.65	15.50		19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73		9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.35	9.25	9.75	9.25	9.10	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25		9.85				
Milwaukee	.15	8.08	9.28	9.93	8.10	8.44	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.31	9.00	9.11	9.01	9.11	9.48		15.02	14.69	18.42	18.29
Norfolk	.20	8.00			8.40	8.35	8.70	8.45		10.70				
Philadelphia	.10	8.25	9.17	10.34	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.15	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland		9.20	11.20	11.55	11.05	9.00	9.35	9.35		13.80	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle		9.55	10.70	11.60	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.65	9.70	9.45	9.50	9.85	10.00	13.55		16.75		20.35
St. Louis	.15	8.29	9.49	10.16	8.34	8.67	8.82	8.58	9.11	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.39	9.59	10.26	8.43	8.90	8.94	8.53		9.21		14.62		18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

Pick exactly the right steel for any job from J & L's complete cold finished line

increased drill life 20% with J & L "1213" steel

This manufacturer of wrench socket blanks averaged 400 parts per hour when he changed to J & L "1213" steel. Form tool life increased from 10 to 20 hours. Drill life was 20% longer. J & L "1200" steels provide higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin
... a great name in steel

MACHINING PERFECTION always starts with the right steel

(Effective June 25, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
Cleveland							13.85
So. Chicago *R8*				9.225			
Ensley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C16*		6.25					
Ind. Harbor *I8*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B8*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B8*	5.275	6.25	6.60			6.275	
Lebanon *B8*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J8*				9.225			
Seattle *B2*				9.725		6.425	13.85
Steelton *B8*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R8*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 47.92
Electrodeposited 39.25
Brass, 80-20, ball anodes, 2000 lb or more 50.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 102.25
(Rolled depolarized add 3¢ per lb)
Cadmium 1.70
Tin, ball anodes and elliptical $1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 74.80
Copper sulphate, 100 lb bags, per cwt. 24.35
Nickel salts, single, 100 lb bags 40.50
Nickel chloride, freight allowed, 300 lb 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 lb 59.00
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 100,000 lb or more 31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½" & smaller x 6" and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy. Full Case or Keg Price

¾ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller	48

Semi-finished Hex Nuts

¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller	64

Rivets

Base per 100 lb
½ in. and larger $11.50
Pct Off List
7/16 in. and smaller 23

Cap Screws

Discount (Packages)

New std. hex head, packaged	Bright	Treated H. C. Heat
⅝" diam. and smaller x 6" and shorter	44	31
¾" ⅞" and 1" diam. x 6" and shorter	27	9
⅝" diam. and smaller x longer than 6"	14	+ 6
¾", ⅞", and 1" diam. & longer than 6"	½	+24

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
In cartons		16	19
	Quantity		
In Bulk ⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 3 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite St. ¾ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

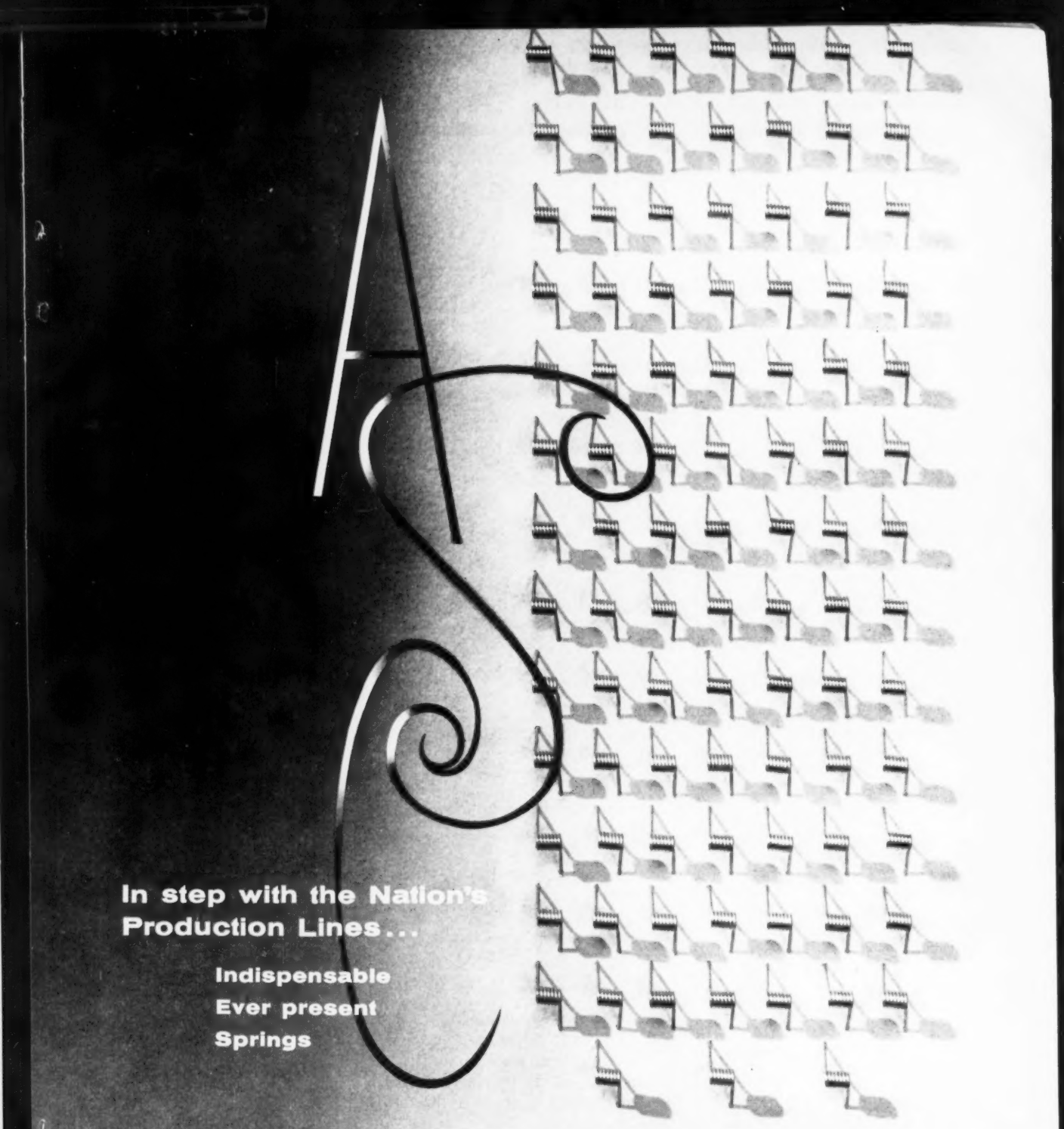
Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, West of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East. carloads	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.90
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.4¢ to 41.5¢
Copper, electrolytic	45.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$3.75 (nominal)
Zinc, 10 ton lots	18.5¢ to 31.7¢



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SEABOARD PACIFIC DIVISION
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F. N. MANROSS AND SONS CO.
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THE WALLACE BARNES CO., LTD.
Hamilton, Ontario, Canada

WALLACE BARNES STEEL DIVISION – Producer of High-Carbon Strip Steel

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Used - As Is - Reconditioned

RAILWAY CARS

All Types

SERVICE-TESTED

FREIGHT CAR REPAIR PARTS

For All Types of Cars

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Diesel, Steam, Gasoline
Diesel-Electric

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STANDARD GAUGE CARS

10—Air-Operated, 30-Cubic Yard, Drop Door

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20—40-Ton Capacity
4—50-Ton Capacity

COVERED HOPPER CARS

15—70-Ton Capacity

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"ANYTHING containing IRON or STEEL"

THE CLEARING HOUSE

Detroit Waits For Auto Pickup

It could be a good year in the Motor City if new model production stimulates business.

Up till now, 1957 hasn't been anything to brag about.

■ There is still no sign of a pickup in the Detroit used machinery business. Generally, dealers feel that the first six months of 1957 were much slower than they have been in previous years.

But most are now hopeful that the slump is just about over. They frankly admit that they are looking for a big change for the better around the middle of July.

New Models Coming — They figure that small job shops should be getting started by then on the new 1958 car programs and that business should pick up accordingly. For this reason most dealers feel that there will be a steady increase in activity right through the end of the year.

At the present time, however, business still leaves a lot to be desired.

Auto Business Hurt—One company figures that roughly 60 pct of the small shops in the Detroit area are mainly concerned with automotive work. These people have had rough going since the first of the year and it has been reflected in their purchase of equipment.

The other 40 pct are more diversified and have been going along at a rather steady rate. It is this business, plus the demand for machinery from outside the state, that has made up the bulk of the Detroit dealers' business so far this year.

Press Demand High — The demand from outside the area is good. Sales of both production and toolroom equipment are being made regularly in neighboring states. Good late model presses are the best sellers.

This also holds true for the Detroit area. Presses are the only types of production equipment that are in good demand. The result is that there is a general scarcity.

One other factor that has been holding business back so far this year is the present money situation and the general feeling on the customers' part that business conditions do not warrant investing too much money in equipment.

However, most dealers feel that with the start of new car production, this situation will take care of itself and that 1957 will be one of the best years.

"Do you call this machine automatic? I've been standing here for three hours and it hasn't even turned itself on."

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSOR
450 cu. ft. Ingersoll Rand XRE, 100# Pressure
100 H.P. Westinghouse Motor 440/3/60
BENDER & STRAIGHTENER
Pels Type JH-26, Bends & Straightens Beams 15x5 81x60 lb., Angles Equal 8x8x1⅛", etc.
BENDING ROLLS
10' x ½" Kling Pyramid Type—LATE
16' x ⅜" Ransome, Pyramid Type
27' x 1" Southwark, Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
12' x ½" Dreis & Krump No. 228
BRAKE—PRESS TYPE
14' x ¼" Superior Hydraulic—NEW
BUILDINGS
70' x 760' x 39'
50' x 325' x 24'
BULLDOZERS
#7 Ajax, 22" Stroke, 12"x65" Face of Crosshead
#27 W & W, 22" Stroke, 16"x80" Face of Crosshead
CORRUGATING MACHINE
12" Stanco Corrugating Machine, Rolls 24" Dia.
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton	P&H	56' Span	220/3/60
5 ton	Euclid	30' Span	220/3/60
5 ton	Whiting	48' Span	230/3/60 A.C.
5 ton	Case	59' Span	220/3/25
8 ton	P&H	55' Span	220/3/60
10 ton	Shepard Niles	27' Span	220/3/60
10 ton	Shepard Niles	38' Span	440/3/60
15 ton	Shepard Niles	52' Span	230 Volt D.C.
15 ton	Shepard Niles	37' Span	220/440 A.C.
15 ton	Shepard Niles	55' Span	220/440 A.C.
15 ton	Niles	75' Span	220/3/60
20 ton	P&H	57' Span	220/440 A.C.
25 ton	Cleveland	70' Span	220/3/60

With 10 ton Auxiliary (Mill Type)

DIEING MACHINE
60-ton Henry & Wright, Roll Feed, Scrap Cutter
4" Stroke NEW 1950
DRAW BENCH
10,000# Aetna Standard Single Draw Tube Draw Bench, 44 Ft. Max. Length of Draw
FORGING MACHINES
1" to 5" Acme, Ajax, National
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING 800 lb to 20,000 lb.
LEVELERS—ROLLER
37" Torrington, 19 Roll 1-31/32" Dia. Backed up
42" Bliss, Capacity .125", LATE
54" McKay, 17 Rolls, 3¾" Dia.
108" American, 17 Rolls, 4½" Dia.
PLANER—PLATE EDGE
35' Southwark, 16 Pneu. Jacks, Capy. 1½"
PRESSES—HYDRAULIC
800 ton Clearing, 48" Stroke, Bed 48 x 48"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESSES—TOGGLE DRAWING
#2½ Bliss 125 ton, Bolster 19" x 26"
#4 Bliss 170 ton, Bed Area 34" x 31"
#1018 Bliss 1550", Die Space 60" x 72"
PRESSES—STRAIGHT SIDE
110 ton Cleveland 55D-54, 5" Stroke
Bolster 32" x 54", Air Cushion
150 ton Cleveland 65D-60, 6" Stroke
Bolster 40" x 60", Air Cushion
PUNCH & SHEAR COMBINATIONS
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker
ROLLING MILLS
6" x 5" Torrington Wire Flattening Mill Line
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 30" Farrel Two Stand Two High
26" x 72" Cold Rolling Mill
22" x 40" Three High Sheet Mill
ROLL—FORMING
11 Stand Dahlstrom, Takes widths to 8"
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—BAR
48" Mesta Bar Shear, Capacity 4" x 35" Slabs Hot.
SHEAR—GATE
12' x ⅜" Niagara Model 1212, NEW 1951
SHEAR LINES
36" Hallden Shear Line
60" Shear Line, With Leveller & Tables
96" x 14 Ga. Cleveland, With Payoff, Leveler, Elect
SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1952
SLITTERS
24" Yoder Slitting Line
36" Payne Slitting Line
STRAIGHTENER
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
SWAGING MACHINES
#4 Fenn, Capacity 2¼" Tubing, LATE
#6½A Fenn, Capacity 2⅜" Tube 3⅜" Solid 16" Die Length Hydraulic Feed, LATE
TUBE MILL
Elma 1K Welded Tube Mill, Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall
WELDERS—SEAM
200 KVA Progressive Universal 220 Volt
400 KVA Federal Circular 440 Volt
500 KVA Federal Longitudinal 440 Volt

• Manufacturing

A. T. HENRY & COMPANY, INC.

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Equipment •

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RE-NU-BILT
GUARANTEED

ELECTRIC POWER EQUIPMENT
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
3	1375	G.E.	MCF	415	1200
1	1200	G.E.	MCF	600	450/600
1	940	Whse.	QM	250	140/170
1	800	Whse.		390	250/550
		With United Gear Set 7:1 Ratio			
8	450	Whse.		550	415
2	300	G.E.	MPC	230	400
1	250	G.E.	MPC	230	400/600
2	200	Whse.	CB-207.4	250	850/1200
1	150	G.E.	CD B.B.	600	250/700
1	150	Cr.Wh.	65-H	230	1150
1	125	Whse.	SK-185	230	350/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
2	75	Cr. Wh.	53 H TEFC	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30/40	Whse.	SK-131.5-BB DP	230	500/1500
3	(unused) 30	G.E.	CDM-85 BB	230	2200

MG SETS — 3 Ph. 60 Cy.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	500/25 cy.	660	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	Whse.	900	125/250	440
2	300	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2300
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	3300 x 2300
1	1500	G.E. auto.	HT	3	4600/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	13800 x 460
2	750	G.E.	Pyranol	1	4800 x 83/55
3	500	Kuhl	OISC	1	13200 x 6900
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	1	13800 x 600
1	300	G.E.	HT	3	4160 x 480/277
1	200	G.E.	AirCooled	3	432-480 x 120/208Y
3	150	G.E.	OISC		33000 x 2300/4000Y
1	50 (unused)	G.E.	Askerel filled	3	13200 x 120/208Y

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

REBUILT — GUARANTEED
ELECTRICAL EQUIPMENT

COMPLETE PACKAGE MILL DRIVE IN STOCK

(1)—800-HP., Whse motor, 168 R.P.M., 710 VDC, sep. excited fields
(1)—720/850-KW Whse. M-G Set, 600/710 VDC Diff. Comp. driven by a synchronous motor 900 R.P.M., 4000/2300,-volt, 3 phase, 60 cycle.
(1)—Starting panel for syn. motor
(1)—4 unit exciter set
(1)—Set of variable voltage control

IDEAL REEL DRIVES

(2)—600-HP Allis-Chalmers mill motors, 600-VDC, 300/600 R.P.M., with a 1200-KW, 600-VDC Westinghouse M-G Set, 1750-HP synchronous motor, 4160/2300-Volt, 3 phase, 60 cycle.
(2)—275-HP Westinghouse mill type motors, 230-Volt, 425/850 R.P.M., with 2 or 3-unit, 600-KW M-G Set, 250-VDC and 900-HP synchronous motor, 2300-Volt, 3 phase, 60 cycle.

SPECIAL

1450 KW double armature Whse. Generator, 600 VDC, 900 R.P.M. separate excited fields, with 2250 HP, syn. motor, 2300/4000 volt, 3 phase, 60 cycle.

MOTOR GENERATOR SETS

Qu.	KW	Make	RPM	D.C. Volts	A.C. Volts
5	1500	Al. Ch.	514	350/700	13800/6900/4160
1	1500	G.E.	514	250	2300/4000
1	1450	Whse.	900	600	2300/4000
2	1250	Al. Ch.	720	600	2300/4000
1	850	G.E.	720	240/350	2300
1	725	Whse.	900	600	2300/4000
1	500	Cr. Wh.	720	600	2300/440
1	500	G.E.	900	250	2300
4	300	Whse.	1200	125/250	2300
1	300 (3-unit)	Al. Ch.	1200	250/300	2300
2	200	Whse.	1200	125/250	2300/440
2	150	Rel.	1200	125	2300/440
1	150	Whse.	1200	125/250	2300/440
1	150	G.E.	1200	250	4800/2300
1	100	Whse.	720	125/250	220
1	75	Whse.	1200	125/250	2300

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- 25 Transformer and Generating Arc Welders
- 2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944
- 6' x 10 ga. Cincinnati Squaring Shear
- ¼" x 8' Pexto Gate Shear; 20" throat
- 4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch
- Williams White Bulldozers from 5-ton to 300-ton
- Landis Landmaco and other Landis Threading Machines
- Single & Double End Punches
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MG Set GE 250KW 250VDC 720RPM 375HP 220V
Compressor 4000# Air 368'PD 150HP SYN MTR
Motor 800 HP West CW 870RPM 2200V, Controls
Diesel Generator 60KW 250VDC Cummins/GE
Guillotine Bar Shear H&J #0 1½" Round Bar
Tube Bender 1¼" W&W Universal Hyd 15HP
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1—28" x 40" HOT STRIP MILL, 2-high, reversing with 2500 HP D.C. motor, etc.
2—28" 3-HIGH ROLL STANDS with inlet, outlet and intermediate tables. Will produce 4" sq. billets from 8" sq. blooms in 6 passes. Includes bloom shear.
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1—25" & 42" x 60" HOT STRIP MILL, 4-high.
1—39" PINION STAND, 2-high, modern design.
1—20" x 48" skin pass mill for strip, 2-high.
2—10" x 10" 2-HIGH COLD MILLS, combination pinion stand and gear set, extra forged steel rolls.
1—16" BAR MILL, 3-high, 4 stands, with speed reducer.
1—10" ROD MILL.
1—9" bar mill, 3-high.
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1—COIL BUILD-UP LINE. Capacity strip 36" max. width by .250" max. thickness.
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2—ROLLER LEVELERS, McKay, rolls 80" face & 5¼" dia. with gear box and universal spindles.
1—STRETCHER LEVELER for sheets, 500,000 lb. capacity.
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2—KANE & ROACH BAR AND ANGLE STRAIGHTENERS, size #4, cap. 3" x 3" x 5/8" angles, 3½" channels and 2" bars.
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1—156" x ¼" SHEET SQUARING SHEAR.
1—SLITTING SHEAR FOR SHEETS, Mesta 92".
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1—MORGAN INGOT STRIPPER CRANE, 50' span, 200 tons capacity, 230 volts D.C.
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1—SCRUBBER AND DRYER for sheets 66" wide.
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1—60" GALVANIZING LINE for sheets, with 2 roller levelers.
1—3500 HP GEAR DRIVE, 514 to 80 RPM, 6.45 to 1 ratio.
1—2000 HP GEAR DRIVE, 200/580 RPM input, 4.44 to 1 ratio.
1—1600 HP GEAR DRIVE, 514 to 87 RPM, 5.9 to 1 ratio.
1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
1—3500 HP MOTOR, 11000 volts, 3 phase, 60 cycle, 514 RPM.
1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
1—STEAM BOILER, 107 HP, 3700 LBS. per hour at 100 lbs., new 1950.

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6 spindle W.F. & John Barnes Vertical Drilling Machine, m.d.
3 spindle Rockford 12" Gang Drill, m.d.
4 spindle No. 201—¼" Barnes, H.D., m.d.
2 spindle Moline Adjustable Rail
6 spindle Model M1613 Pratt & Whitney In Line Vertical Drill

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No. 4-48" Defiance Machine Co., Drill, m.d.
No. 150 Baker Single spindle, m.d.
No. 201—¼" Barnes Single Sp. Self-Oiling All Geared Drill & Tapper, m.d.
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Roll, No. 1B Kane & Roach straightening
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Lapper, No. 2 Cincinnati centerless, MD
Hone, No. 224-B Barnes hydraulic single spindle
Engraver, Model BL 2416 Pratt & Whitney Keller, 3 spindle
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Compressor, 390 CFM Ingersoll Rand type XRE, 2 stage
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10½" x 10½" No. 3 Motch & Merryweather cold metal
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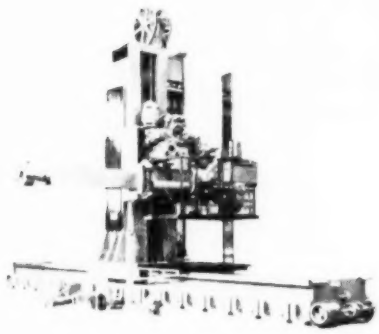

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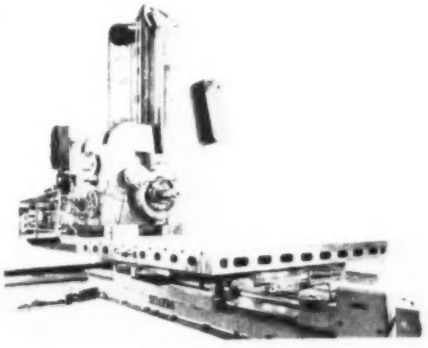

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1—10 ton Alliance O.E.T. Crane, 230 volt, 43'10" span, cab operated box type girders.

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1—Lime Kiln, 6' x 72' long, with drive, reducer and equipment.

We fabricate top charge electric melting furnace charging buckets for any size furnace.

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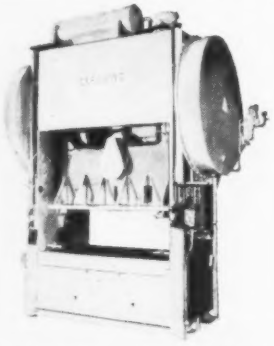

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5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets. Each consisting of:

2—1750-KW, 250/350 Volts parallel, 500/700 Volts series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C. Allis-Chalmers DC Generators with Class B Insulation, separately excited, direct connected in the center to:

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Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.

All mounted on a structural steel base approximately 27' long x 11' wide.

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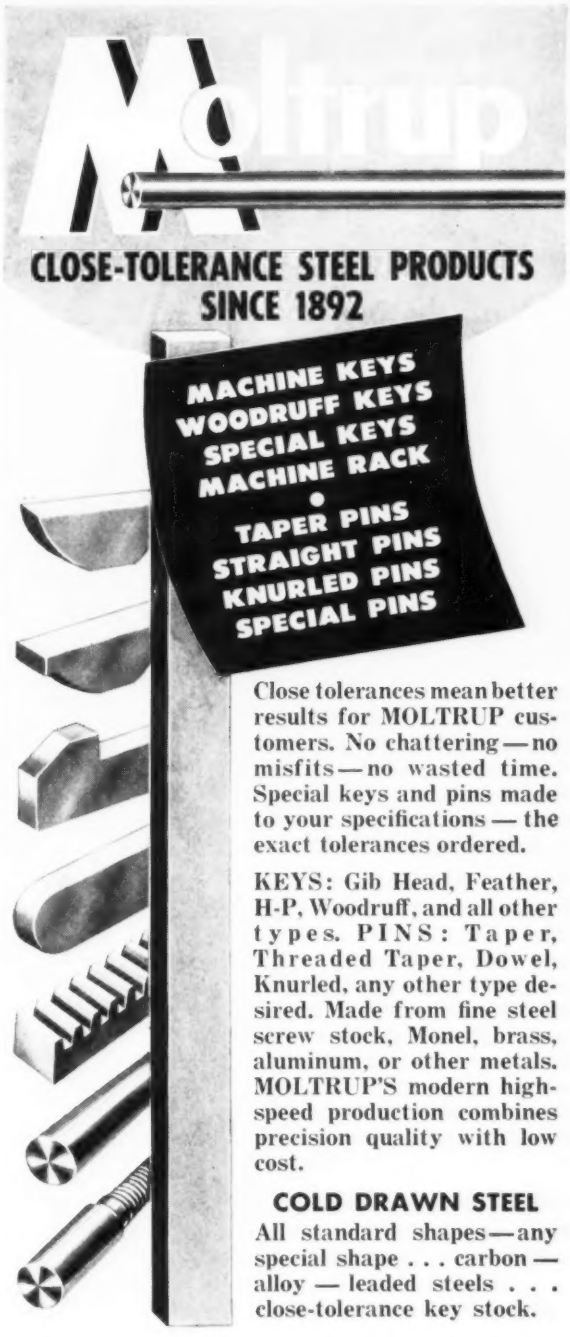

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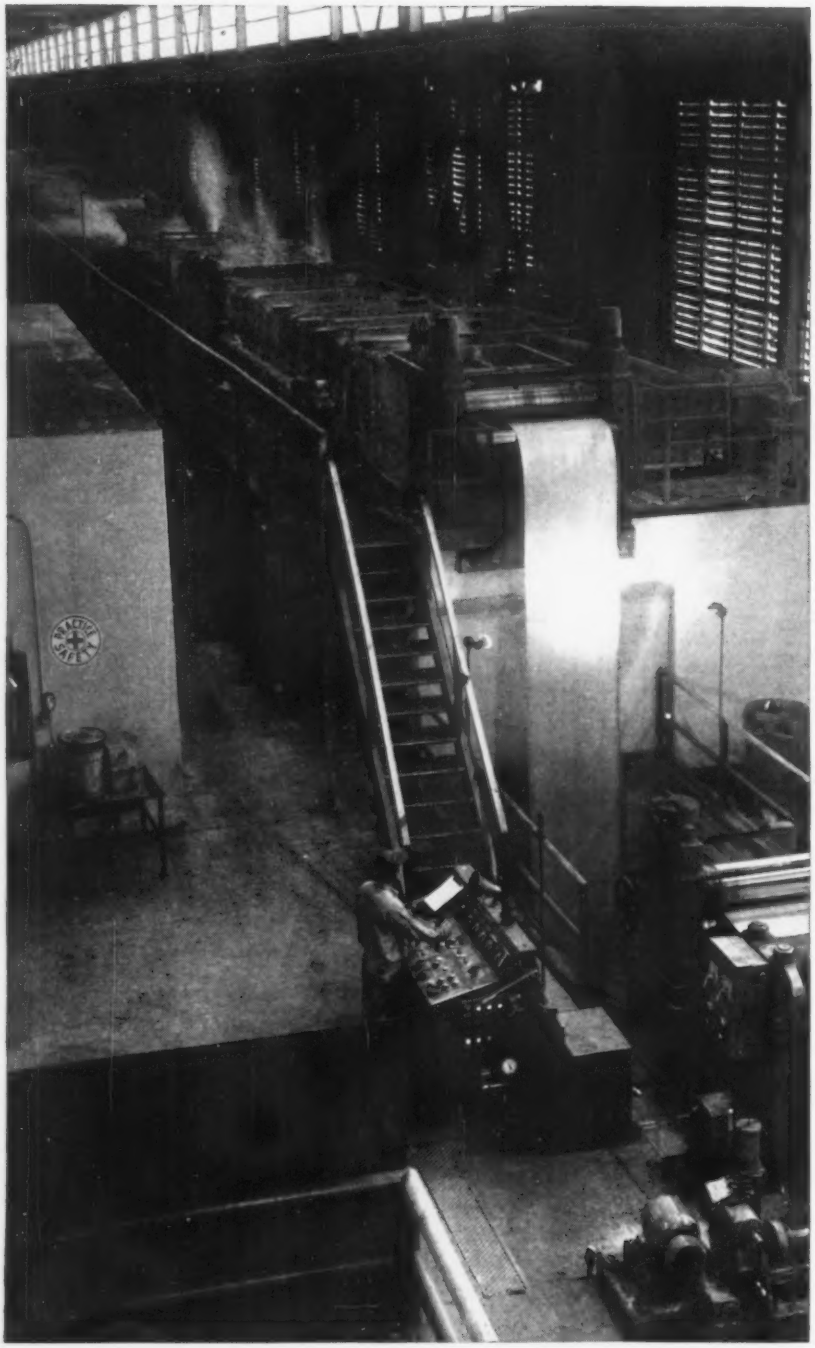
S-2

B.F.Goodrich report:

Men used to be in danger—giving steel an acid bath



A typical example of B.F.Goodrich improvement in rubber

THE job of cleaning rust off of long strips of steel used to be slow, costly and plenty dangerous because nothing could hold the hot acid. All kinds of tanks were tried—wood, concrete, steel. Yet acid leaked onto the floor constantly—a waste, a hazard to workmen.

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Acid leaks stopped wherever this B.F.Goodrich lining was used. The waste and hazard of messy, acid-wet floors became a thing of the past. At the Kaiser Steel plant pictured here, the B.F.Goodrich rubber-lined tank has been in constant use four years without maintenance expense of any kind. In many plants, linings have been in service 15 or 20 years.

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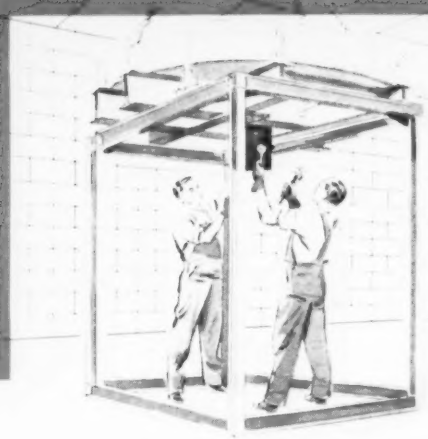
Customer's Report



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Base fans	198	320	432
Heater tubes	720	725	900
Burners	720	725	900
Thermocouples (base)	198	320	432
Furnace blower motors	72 (5 H.P.)	29 (10 H.P.)	18 (20 H.P.)
Instruments	72	58	36
Inner covers	198	320	432
Gas pressure regulators	72	29	18
Thermocouples (Fce.)	72	58	36
Bases (pedestals)	198	320	432
Total maintenance items	✱ 2,718	✱ 3,224	✱ 4,068
% Increase	–	18.6	49.0

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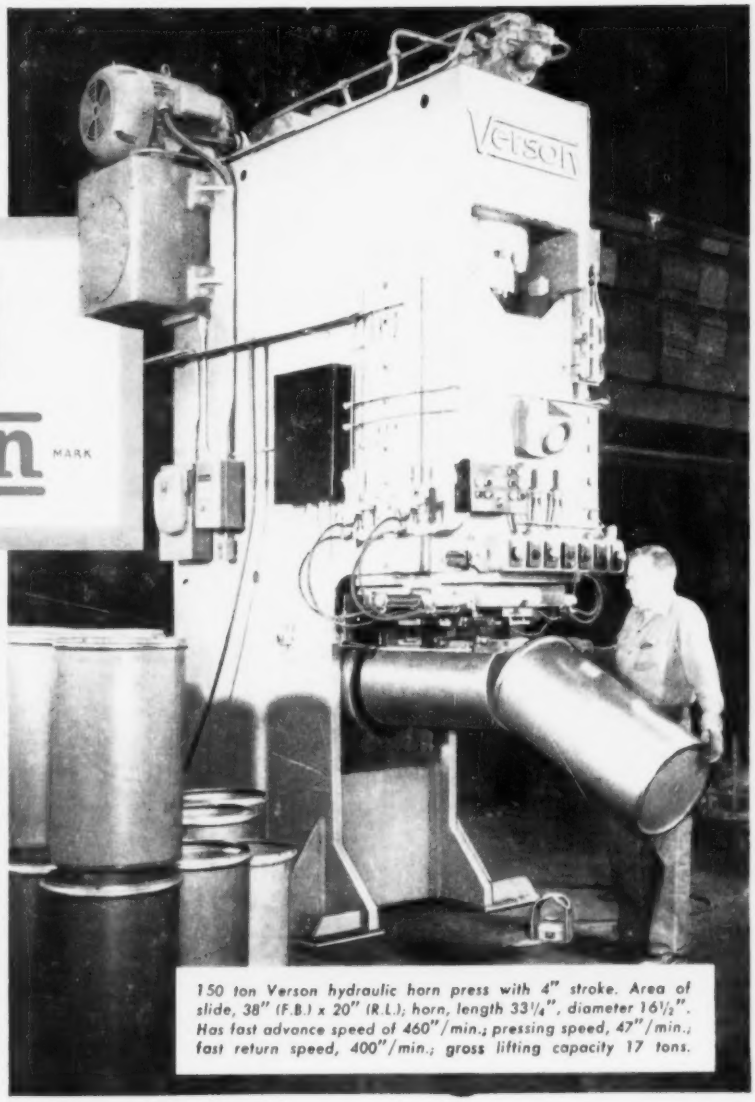

150 ton Verson hydraulic horn press with 4" stroke. Area of slide, 38" (F.B.) x 20" (R.L.); horn, length 33¼", diameter 16½". Has fast advance speed of 460"/min.; pressing speed, 47"/min.; fast return speed, 400"/min.; gross lifting capacity 17 tons.

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